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EXCERPTS FROM TRIAL TRANSCRIPT

WITNESS FOR PLAINTIFF

Francis C. Witkoski:	
Direct	29a
(Recalled):	
Direct	45a
Cross	45a

WITNESSES FOR DEFENDANT

Alexander Quayle:	
Direct	37a
Cross	39a
James Lewis Burati:	
Direct	43a

Relevant Docket Entries

Opinion and mandate of the Fourth Circuit Court of Appeals, Appeal No. 12,020, November 6, 1968, 404 F. 2d 450 (1a).

Order of the Fourth Circuit Court of Appeals, filed November 22, 1968 (14a).

Opinion of the District Court, S. D. W. Va., July 25, 1967, on motion for new trial, not reported (15a).

Opinion of the District Court, S. D. W. Va., March 23, 1967, on motion for new trial, not reported (16a).

Final Decree of the District Court, S. D. W. Va., entered May 29, 1967 (28a).

Petition to the Supreme Court of the United States for Writ of Certiorari to the United States Court of Appeals for the Fourth Circuit, granted March 24, 1969.

Opinion and Mandate United States Court of Appeals for the Fourth Circuit, November 6, 1968

HAYNSWORTH, Chief Judge:

The patent owner has appealed from a judgment holding the patent invalid for obviousness. Since we conclude that the patent represents a broader advance than the narrow step which occupied the attention of the District Court, we reverse.

The plaintiff, Pavement Salvage Company, Inc., is the owner of Neville Patent No. 3,055,280 covering "Means for Treating Bituminous Pavement." It brought this action against Anderson's-Black Rock, Inc., a highway con-

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tractor, who used, in an allegedly infringing manner, a radiant energy generator manufactured and sold by Aeroil Products Company, Inc. Aeroil conducted the defense and is the real defendant.

The patent claims in combination the essential parts of a bituminous concrete paving machine together with a prescribed kind of radiant energy generator. The combination produces a fused bond between a course being laid and an adjacent course previously laid and grown cold. It has met with commercial success and is said to have acceptably answered a problem of long standing.

Bituminous concrete, the familiar black or dark material used for surfacing highways, parking areas, airport runways and taxi-ways, is ordinarily laid in strips by a mobile machine. The material, preheated in a plant to more than 250°, is transported to the site and delivered into the hopper of the paving machine. The paver contains means to spread the material laterally and to smooth, tamp and shape it while the machine is in forward motion. It thus produces a continuous strip of bituminous concrete up to twelve feet in width. It is possible to have several pavers working in tandem so that each strip is laid before the adjacent strip has cooled, but that is frequently impossible. The need to maintain traffic and limitations upon the availability of equipment and of an adequate supply of the hot material frequently necessitate the laying of one strip at a time. In that event, the hot material of the second strip will not bind with the cold material of the first strip, leaving what has long been known as a "cold joint."

Where there is a cold joint, water and dirt will infiltrate. After some freezing and thawing, there will be

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raveling at the joint and early disintegration of the pavement.

The same problem, in a different context, was presented in the early days of the use of bituminous paving materials. When patching was necessary, the absence of bonding between the new, hot material and the old, cold material created the same openings for the seepage of water and dirt with their deleterious effect. Not surprisingly, attempts were made to obtain bonding by preheating the old material. The use of open flames, however, would carbonize the old material, accentuating, rather than alleviating, the difficulty. As early as 1905, Morcom Patent No. 799,014 taught the use of a radiant heat burner, with a solid bottom plate, and with side curtains which could be lowered to prevent the flow of cold air between the burner and the bituminous surface. There followed a number of other patents on heaters and associated equipment for heating the old material during patching or surface smoothing operations.¹ British Patent No. 756,911 (1956) actually taught the use of a radiant heater to soften the edge of a previously laid strip of bituminous concrete before placing an adjacent course.

The difficulty with these earlier patented devices was that they would not work in commercial operation. Open flame devices which carbonized the material were detrimental, while the radiant heaters were ineffective because they produced insufficient penetrative heat to secure bonding of the old material with the new. The consequence was that the industry turned to other methods in its attempt to deal with the problem of cold joints.

¹ Switzer Patent No. 1,136,294 (1915); Flynn Patent No. 2,053,709 (1936); Wells Patent No. 2,254,463 (1941); Fizzell Patent No. 2,705,906 (1955).

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When Neville, the patentee, came on the scene, the prevalent and preferred practice was far removed from the old idea of heat treatment. Before the second, adjacent course was laid, the edge of the first course was cut back for several inches, with pneumatic hammers or other devices, to produce a clean vertical surface, which was then painted with hot asphalt. This was expensive, of course, and there were other disadvantages. The cutting disturbed and weakened the structure of the first course, and the final surface was left with a built-in joint. It was not a solution of the cold-joint problem, but the best, known method of minimizing its adverse consequences.

The patentee, in seeking a solution, turned away from current concepts and harked back to the discarded notion of preheating the old material. His patent prescribes the use of a radiant energy generator, having as its base a plate of plastic or metal with many small perforations in it, so that it resembles a grid or gauze. The generator is so designed that combustion occurs in the perforations or adjacent to the perforated base plate. It produces highly penetrative radiant energy, with concentrated wave lengths of approximately three microns. Its use in conjunction with a bituminous paver results in complete bonding between the first course, grown cold, and an adjacent second course. The fusion is complete, and cores disclose no joint into which deleterious substances might seep or be worked. The combination was novel, and it has an obvious utility of practical and economic importance.

Neville was not the inventor of the generator. His is not unlike that disclosed in Schwank Patent No. 2,775,294 (1956). His contribution was the elimination of the cold joint in bituminous concrete paving, and his claims en-

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compass no other uses of such generators. The question, then, is whether the solution "would have been obvious at the time the invention was made to a person having ordinary skill in the art . . ." within the meaning of 35 U. S. C. A. §103, as interpreted in *Graham v. John Deere Co.*, 383 U. S. 1. More specifically, the question is whether, in light of the availability of more efficient radiant energy generators, the answer obviously lay in the theretofore unworkable and discarded art of heat treatment. Our inquiry will be facilitated by resort to those "secondary considerations" which the Supreme Court recognized in *Graham v. John Deere Co.* as "indicia of obviousness or nonobviousness."

The appropriateness of the use of such considerations arises out of the necessity of framing the question of obviousness in terms of available knowledge at the time of the claimed invention and the desirability of avoiding subjective appraisals with high coloration from the patent's disclosure. As the Supreme Court said in *Diamond Rubber Co. v. Consolidated Rubber Tire Co.*, 220 U. S. 428, 435:

"Knowledge after the event is always easy, and problems once solved present no difficulties, indeed, may be represented as never having had any, and expert witnesses may be brought forward to show that the new thing which seemed to have eluded the search of the world was always ready at hand and easy to be seen by a merely skillful attention."

Similarly, in *S. H. Kress and Co. v. Aghnides*, 4 Cir., 246 F. 2d 718, 723, we said:

"Obviousness does not mean that one skilled in the art can perceive the solution after it has been found

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and pointed out by someone else; the test of obviousness is as of an earlier time, when the search is on."

The usefulness of such considerations in providing objective indicia to guide decisions is well recognized.² The difficulty in obtaining reliable judgments without them was stated by Judge Learned Hand in *Reiner v. I. Leon Co.*, 2 Cir., 285 F. 2d 501, 503-504:

"The test laid down is indeed misty enough. It directs us to surmise what was the range of ingenuity of a person 'having ordinary skill' in an 'art' with which we are totally unfamiliar; and we do not see how such a standard can be applied at all except by recourse to the earlier work in the art, and to the general history of the means available at the time. To judge on our own that this or that new assemblage of old factors was, or was not, 'obvious' is to substitute our ignorance for the acquaintance with the subject of those who were familiar with it."

With such criteria, however, reliable guideposts can be erected. As we said in *Allen v. Standard Crankshaft and Hydraulic Co.*, 4 Cir., 323 F. 2d 29, 34:

² See *Skee-Trainer, Inc. v. Garelick Mfg. Co.*, 8 Cir., 361 F. 2d 895; *Jones Knitting Corp. v. Morgan*, 3 Cir., 361 F. 2d 451; *Bentley v. Sunset House Distributing Corp.*, 9 Cir., 359 F. 2d 140; *Schnell v. Allbright-Nell Co.*, 7 Cir., 348 F. 2d 444; *M. B. Skinner Co. v. Continental Industries, Inc.*, 10 Cir., 346 F. 2d 170; *Allen v. Standard Crankshaft and Hydraulic Co.*, 4 Cir., 323 F. 2d 29; *Lorenz v. F. W. Woolworth Co.*, 2 Cir., 305 F. 2d 102, and dissenting opinion on 106; *Honolulu Oil Corp. v. Shelby Poultry Co.*, 4 Cir., 293 F. 2d 127; *Reiner v. I. Leon Co.*, 2 Cir., 285 F. 2d 501; *Safety Car Heating and Lighting Co. v. General Electric Co.*, 2 Cir., 155 F. 2d 937; *Blumcraft of Pittsburgh v. United States*, Ct. Cl. 372 F. 2d 1014; *Application of Polson*, C.C.P.A., 368 F. 2d 267.

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"In approaching the question of obviousness, however, judges should mistrust their subjective notions if there are objective indicia to guide their judgments. Though the answer after the event may appear simple, the Court should not convert its simplicity into obviousness in the face of hard proof of recognized need for the answer, of long, unsuccessful search for the answer by people of skill in the art, of recognition by the industry that the claimed invention was the answer, and of its prompt adoption with attendant commercial success. Even a substantial combination of some of such criteria ought to outweigh a judge's subjective conviction that if one as skilled as he had really looked for the answer, he immediately could have put his finger upon it."

With that introduction, we turn to those secondary considerations as disclosed in this record.

Clearly, there had been a long felt need for a solution of the cold joint problem. Morcom sought it in 1905, and, in his patent, he recites earlier attempts to find it. The cluttered field attests the continuity of the search, and the testimony of the experts demonstrates the gravity of the problem and recognition of continuing need for a more satisfactory solution than cutting back the edge of the first course.

If it be said that the solution was dependent upon the development of generators of the Schwank type, the answer did not come with their appearance. Schwank applied for his patent eight years before Neville's application, and the Schwank patent issued more than two years earlier.

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That the bituminous paving industry was not expecting a solution through the development of new generators is dramatically illustrated by the incredulity with which it received Neville's concept.

Neville approached the Director of Research of the Pennsylvania Department of Highways, and explained to him the equipment he had and what it would do. The Director testified that Neville was an imposing, impressive man, but that he simply did not believe him.

Neville sought to interest the engineer in charge of the maintenance and construction of Air Force bases, but that official testified that he did not believe Neville's equipment would work. Crowley, the Air Force engineer, remained unconvinced until he received a report of a demonstration Neville finally arranged in California. An official of California's Department of Public Works informed Crowley of the success of the demonstration, adding that, if he had not seen it himself, he could not have believed it. Only after that was the Air Force willing to experiment with Neville's equipment.

The fact that experts in the field received Neville's disclosure with such skepticism and disbelief strongly indicates that, at the time, a person of ordinary skill in the field would not have sought the answer in the disproven method of heat treatment.

After demonstrations verified Neville's claims, they have met with substantial commercial success. The Air Force and some states prescribe the use of such equipment; other states use it. Patents have been obtained in the United Kingdom, Canada and Mexico. Foreign and domestic concerns have obtained licenses, and others have purchased

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the complete equipment from Pavement Salvage without attempting to circumvent the patent. Only Aeroil sought to operate independently and to contest the patent's validity. In doing so, it sold its equipment widely, domestically and abroad.

In promoting the sales of its own products, Aeroil paid high tribute to the new concept. In its catalogues it declared that with the new equipment a "truly homogenous joint is obtained," "a perfect bond." In one of its bulletins it went further when it proclaimed, "This remarkable new development is a dramatic breakthrough * * *. INFRA-RED heat is not new, but the application is revolutionary * * *." Words extolling its own products in sales promotional material should be discounted, perhaps, but the "dramatic breakthrough" was Neville's; the "revolutionary" application of the energy was his, not Aeroil's. Such statements, of course, are quite inconsistent with Aeroil's present position that what Neville did would have been obvious to a person having ordinary skill in the art.

As we have indicated, it is not contended that Neville's claims are anticipated by any prior art patent. It is contended that three or more of them, together, disclose all that Neville claimed, and that because he cannot separately claim the generator or the basic paving machine, he cannot claim the combination. The defense is simply obviousness. The prior art, however, is predominantly a long history of failure to solve the problem by heat treatment. At a time when the industry was concentrating on a quite different, though expensive, partial corrective, there was nothing in the junk pile of prior art heat treatment patents to make it obvious to anyone that they supplied the ultimate solution. That this is so is forcefully demonstrated by the duration of the fruitless search, by the skepticism

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and incredulity with which experts in the field received Neville's disclosure, by its commercial success after demonstrations dissipated the disbelief of the experts, by the conduct of competitors in accepting licenses and purchasing equipment and the bold tribute of the alleged infringer in hailing it as the very antithesis of the obvious.

The District Court was not unimpressed with all of this, but it viewed the question as if it were known that the answer lay in heat treatment and that a generator of the type described by Neville would do the job. Had it been known that the result could be achieved by a generator and a paving machine handled separately but cooperatively, combining the two in one machine for the sake of convenience would have been an obvious step, but that was not known. Neville supplied the whole of the answer which had completely eluded the industry. His contribution cannot be judged without reference to its salient feature, disclosure of the fact that the solution lay in the use of a specified kind of infra-red generator in combination with the basic paving machine.

We reverse the judgment holding the patent invalid and remand for further proceedings on the infringement and other issues.

Reversed and remanded.

CRAVEN, Circuit Judge, dissenting:

The court concedes, as I read the opinion, that what makes the thing work is better radiant heat generators of the Schwank type. It is not even contended that Pavement Salvage can monopolize such improvements. Nor is it demonstrated to my satisfaction that the combination on one chassis of the paving machine and heat generator is

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necessary to produce the desired result. Yet, the combination is held patentable, though for all we know the same desired result may be achieved by two machines juxtaposed and separately propelled.

I adopt what was said by Judge Field in his unpublished opinion below:

"[P]laintiff has combined four elements which were known in the prior art. Three of the elements, the screed, leveler and spreader, when constructed on one chassis would not be a patentable invention. However, plaintiff added to this combination the element of a radiant burner. The burner, by itself, is also not patentable. Therefore, the question here is whether the addition of the burner to the paving machine which contains the other three elements has overcome the obviousness of the total combination.

"... Plaintiff's patent is a combination patent. The question of radiant heat was old in the art. The pivotal question would be more logically appear to be, assuming that the radiant heat would work effectively, was it obvious that a more successful machine would evolve if all of the elements were constructed on one chassis? It is my opinion that such a combination was reasonably obvious to one possessing ordinary skill in the art.

"In *A & P Tea Co. v. Supermarket Corporation*, 340 U. S. 147 (1950) the Court made the following statements:

'It is agreed that the key to patentability of a mechanical device that brings old factors into co-operation is presence or lack of invention.

• • •

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‘The negative rule accrued from many litigations was condensed about as precisely as the subject permits in *Lincoln Engineering Co. v. Stewart-Warner Corp.*, 303 U. S. 545, 549:

“The mere aggregation of a number of old parts or elements which, in the aggregation, perform or produce no new or different function or operation than that theretofore performed or produced by them, is not patentable invention.”

• • •

‘The conjunction or concert of known elements must contribute something; only when the whole in some way exceeds the sum of its parts is the accumulation of old devices patentable. Elements may, of course, especially in chemistry or electronics, take on some new quality or function from being brought into concert, but this is not a usual result of uniting elements old in mechanics.’

“The Court then makes this meaningful observation:

‘Courts should scrutinize combination claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements.’

“Plaintiff contends that its combination of elements has solved the age-old problems of asphalt paving; that the invention has, by its combination, produced a new result which has advanced the art, and further points to its commercial success and the fact that it has answered a long-felt want.

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"*Entron of Maryland v. Jerrold*, 295 F. 2d 670 (4th Cir. 1961), set forth the standard for determining whether the elements of a combination exhibit a new result in the following language:

'The inquiry should more appropriately be directed to whether the elements of the combination perform or produce a new, different or additional function or operation . . . in the combination than that theretofore performed or produced by them.'

"It is my opinion that plaintiff's combination in no way exceeds the sum of its parts. Each element of the combination performs in the same manner and performs the same job that it formerly did when not in combination. All that plaintiff has done is to construct four elements known in the prior art on one chassis. In regard to plaintiff's contention of commercial success, see *A & P Tea Co. v. Supermarket Corp.*, *supra*, at 153, wherein the Court stated:

'The Court of Appeals and the respondent both lean heavily on evidence that this device filled a long-felt want and has enjoyed commercial success. But commercial success without invention will not make patentability . . .'

"Based upon the foregoing, it is my opinion that the Neville patent is not a valid patent . . ."

I think Judge Field correctly adjudged invalidity of the patent and that the court, in reversing his decision, ignores the teaching of *Lincoln Engineering Co. v. Stewart-Warner Corp.*, 303 U. S. 545, 549 (1938), relied upon by the district court.

I respectfully dissent.

**Order of the United States Court of Appeals for the
Fourth Circuit Filed November 22, 1968**

UNITED STATES COURT OF APPEALS

FOR THE FOURTH CIRCUIT

No. 12,020.

PAVEMENT SALVAGE COMPANY, INC.,
Appellant,

vs.

ANDERSON'S BLACK ROCK, INC.,
Appellee.

**Appeal from the United States District Court for the
Southern District of West Virginia, at Charleston.**

**Upon the petition of the appellee by its counsel, and for
cause shown,**

**It is ordered that the mandate be, and it is hereby,
stayed pending application of the appellee in the Supreme
Court of the United States for a writ of certiorari to this
Court, provided the application is filed in the Supreme
Court within the time prescribed by law .**

s/ CLEMENT F. HAYNSWORTH, JR.
Chief Judge, Fourth Circuit.

A True Copy, Teste:

SAMUEL W. PHILLIPS, Clerk

By JO ANN KIRKPATRICK,
Deputy Clerk

Filed Nov 22 1968

SAMUEL W. PHILLIPS
Clerk

Opinion of the District Court, S. D. W. Va., July 25, 1967

July 25, 1967

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Re: Pavement Salvage Company, Inc.
v. Andersons'-Black Rock, Inc.
Civil Action No. 2927

Gentlemen:

I have given careful consideration to the motion of the plaintiff for a new trial and to amend the judgment entered in this case, and have concluded that the motion presents no material or grounds which would justify any change in the conclusions which I reached in this case as set forth in my opinion filed on March 23, 1967.

Accordingly, the motion will be denied and counsel may prepare an appropriate order.

Very truly yours,

JOHN A. FIELDS, JR.
United States District Judge

**Opinion of the District Court, S. D. W. Va.,
March 23, 1964**

**IN THE
DISTRICT COURT OF THE UNITED STATES
FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA
AT CHARLESTON
Civil Action No. 2927**

PAVEMENT SALVAGE COMPANY, INC.,

Plaintiff,

v.

ANDERSONS' BLACK ROCK, INC.,

Defendant.

OPINION

Pavement Salvage Company, Incorporated (hereinafter called Pavement Salvage) brought this action for patent infringement against Andersons'-Black Rock, Incorporated (hereinafter called Andersons'). The patent in suit United States Patent No. 3,055,280 for "Means for Treating Bituminous Pavement" (hereinafter called the Neville patent) and was issued on September 25, 1962. Application for the patent was filed February 20, 1959, by Charles A. Neville. The patent was assigned by Neville to Pavement Salvage.

Paving materials for highways consist of two "classes" of concrete—Portland cement concrete and bituminous concrete, the latter being the class in which we are interested. Bituminous concrete is formed by heating an asphaltic material to a sufficient temperature to make it readily

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workable and then mixing it with a heated aggregate (sand or gravel).

The problem of keeping transportation moving and the width of the modern highways makes it desirable to pave the roadway in two or more strips. It is here that the problem is created. The bituminous mixture used must be poured at a temperature of 250° to 290° Fahrenheit in order that it be pliable and capable of being shaped. As is frequently the case, the first strip of asphalt has cooled substantially by the time the adjoining strip is to be laid, creating what is known as a "cold joint". This so-called cold joint results in a poor bonding between the strips, allowing dirt and water to enter between them, ultimately leading to deterioration of the roadway. This deterioration brought about by the cold joint has long been a problem in the field of highway paving.

In an effort to eliminate the cold joint, three procedures have been attempted. One approach was the use of a direct flame on the asphalt in an attempt to soften it sufficiently to produce a homogeneous fusion with the strip being laid. This, however, frequently caused the asphalt to carbonize, resulting in poor bonding of the two strips.

Another theory has been to cut back several inches from the edge of the previously laid strip and paint the strip with hot asphalt. This has proved more successful than the use of the direct flame but ordinarily the cold joint is still present.

The third method is that of using radiant heat rather than direct heat. This procedure was used as early as 1905 in patching asphalt, and is the method which is most widely utilized by the paving industry today.

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The Neville patent description claims a combination of apparatus for delivering penetrative radiant energy to the exposed edge of the primary lane of pavement, placing bituminous material against that lane, and then shaping the newly placed material to desired contour and surface. The apparatus or machine which performs these functions is the invention which is involved in the present controversy.

The Neville patent has nine claims, eight of which Andersons' have allegedly infringed. The claim which is best illustrative of the patent is claim 4, which states:

"4. Bituminous material paving apparatus comprising penetrative radiant energy generating means, bituminous material placing means, and pavement shaping means, said generating means being supported at a distance from the pavement and being movable along the surface whereby exposure of the pavement to generated energy is limited and scorching of the pavement avoided, said generating means comprising an enclosed chamber having a perforate member forming a lower surface of said generating means, and means to supply fuel to said generating means and pass it outwardly through said perforate member while combusting the fuel adjacent said perforate member thereby heating said perforate member to a high temperature whereby penetrative radiant energy is generated and directed against a portion of previously placed bituminous material, said bituminous material placing means being disposed to place additional bituminous material adjacent the section exposed to said penetrative radiant energy, said pavement

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shaping means being disposed to shape the newly placed bituminous material to a desired contour and finish."

The other alleged infringed claims are merely descriptive of the various aspects of the invention.

The patent then merely claims a paving apparatus comprised of: (1) a penetrative radiant energy generating means, (2) a bituminous material placing means and (3) a means for shaping pavement. Prior art indicates that these individual means were known and used for a long period by persons familiar with the art of highway paving prior to the advent of the Neville invention.

In considering the prior art in chronological order, the first relevant patent is United States Patent No. 799,014 (referred to hereafter as the Morcom patent) which was issued in 1905. This patent teaches the repair of asphalt pavement by the use of radiant heat. In describing his invention Morcom stated:

"In my improved construction the heat is conveyed by radiation from the bottom of the combustion-chamber, which is maintained in suitable proximity to the pavement, whereby the heat is effectually applied. . . .

" . . . This heat prepares the said portion of the pavement to receive the new material and unite therewith, as heretofore explained."

Here then was an apparatus patent in 1905 which used radiant heat for the purpose of repairing asphalt. Pavement Salvage contends that this does not apply to the Neville patent because the Morcom invention was for

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"patching" only, whereas the Neville machine provides for the continuous paving along a strip to prevent a cold joint. Concededly, the Morcom patent teaches only the process of radiant heat and does not go into the process of spreading and shaping the bituminous concrete.

In 1915 United States Patent No. 1,136,294 was issued to Charles Switzer. This patent pertained to an invention for heating asphalt pavement. The object thereof was to soften the surface by radiant heat, so that a weighted roller, when run over the pavement, would smooth or shape it. In this patent the radiant heating mechanism and the roller were combined in one frame. Again it should be pointed out that this provided no means for the simultaneous dispersion of the asphaltic material.

United States Patent No. 2,053,709 was issued in 1936 and pertained to a "road reconditioning method and machine". The inventor, B. H. Flynn, stated that:

"The invention relates to the conditioning of gravel roads, asphalt roads, * * * after the surfaces thereof have become so rough and/or undulatory that even the most careful resurfacing in the customary ways will not restore them to the smoothness required. * * * It is the object of my invention, however, to provide for effectively reconditioning the surfaces of the roads * * * without disturbing anything but the surface material, and moreover to provide for reuse of the material."

Flynn's patent goes on to say that the roadway is heated to between 125° and 150° Fahrenheit and the heated surface is then hewed away. The material which is hewed away is spread upon the subsurface and "then sprayed

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with cut-back asphalt or other suitable binder * * * proving a new surface''. This invention combines the heating of the road surface to make it workable and, to a degree, the application of a new surface, by the use of a binding material sprayed from the machine together with fragments of the old road surface. No specific means for heating the road was mentioned nor did it provide any method to shape and smooth the new road surface.

I. M. Wells was granted Letters Patent No. 2,254,463 in 1941 pertaining to a means for constructing and reconstructing road surfaces. This machine consists of a heater to soften the road surface, an apparatus for dispensing aggregate with the semi-liquid surface and a roller for imbedding the aggregate into the surface. The roller would also serve to shape the asphalt. The method of heating is stated thusly:

“ * * * The flames from the burners are indicated as directed down onto the road surface for converting the top material of the road into a semi-fluid mass. However, the heating of the road is not limited to this specific method of heating or to the specific structure shown.”

The patent granted J. L. Fizzell in 1955, Patent No. 2,705,906, performs much the same function as the Flynn and Wells patents. The patent describes an “asphalt road heater planer”. The functions performed consist of heating the road surface and planing a portion therefrom in order to level and smooth it.

There is no need to discuss Patent No. 2,775,294 issued in 1956 to G. Schwank which discloses a radiation burner, since the burner itself is not covered by the Neville patent except as one of the elements of the combination.

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The Neville patent is, as stated before, a combination patent combining the elements of a screed, a spreader, a leveler and a radiation burner. The patent as issued calls for a combination of these elements on one chassis.

The present controversy resulted from the action of Andersons' placing a radiation heater on the front of a Blaw-Knox paver, thus allowing the defendant's machine to perform the same functions with the same basic elements as those described in plaintiff's patent. Pavement Salvage claims that its patent has been infringed whereas defendant, Andersons', in its answer challenges the validity of plaintiff's patent and denies infringement. The two issues, of course, are: (1) is plaintiff's patent valid, and (2) if so, has defendant been guilty of infringement.

In regard to the issue of validity, it is conceded by plaintiff that its invention is merely a combination of elements. Plaintiff further conceded that each of the elements was known to the prior art. However, plaintiff contends that the combination of these elements presents a new and useful result amounting to inventiveness, and further, no single item of the prior art discloses the claimed combination. 35 USCA §103 states that:

"A patent may not be obtained though the invention is not identically disclosed or described as set forth in Section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made."

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The validity of plaintiff's patent is therefore dependent upon this section of the Code and the case law evolving therefrom. Title 35 USCA Section 282 provides that a patent shall be presumed valid and casts the burden of establishing invalidity upon the party asserting it. In commenting on this statutory burden in *Universal Incorporated v. Kay Manufacturing Corp.*, 301 F. 2d 140 (4th Cir. 1962) the Court stated:

"The plaintiff is also entitled to the benefits of the statute, 35 USCA Section 282. * * * We do not think as the plaintiff contends that an infringer must prove invalidity beyond a reasonable doubt. The cases on which the plaintiff relies for this rule, * * * were cases in which priority of discovery of the same invention was the issue rather than invalidity by reason of relevant disclosures of the prior art."

See also *Keiser v. High Point Hardware*, 311 F. 2d 850 (4th Cir. 1962) and *United States Pipe and Foundry Co. v. Woodward Iron Co.*, 327 F. 2d 242 (4th Cir. 1964).

In the present case the defendant, then, must prove that plaintiff's invention was unpatentable, and this must be done by showing that the invention was obvious in the prior art, and that the combination in its patent has created no additional or different function nor produced any unusual or unique results.

In *Graham v. John Deere Co.*, 383 U. S. 1 (1966), the Court referred to the statutory test of obviousness as set forth in 35 USCA §103, and went on to state with respect to the 1952 Patent Act:

"The Act sets out the conditions of patentability in three sections. An analysis of the structure of

Opinion of the District Court

these three sections indicates that patentability is dependent upon three explicit conditions: novelty and utility as articulated and defined in §101 and §102, and nonobviousness, the new statutory formulation, as set out in §103. * * *

As was stated earlier, plaintiff has combined four elements which were known in the prior art. Three of the elements, the screed, leveler and spreader, when constructed on one chassis would not be a patentable invention. However, plaintiff added to this combination the element of a radiant burner. The burner, by itself, is also not patentable. Therefore, the question here is whether the addition of the burner to the paving machine which contains the other three elements has overcome obviousness of the total combination.

The plaintiff bases his argument of unobviousness on the following points: The testimony of plaintiff's witnesses Witkoski and Crowley, who stated that during the critical period they were doubtful whether plaintiff's invention would be successful. These witnesses, however, were basing their opinion on the fact that they were doubtful that radiant heat would solve the problem of cold joints. I am of the opinion that this does not get to the heart of validity. Plaintiff's patent is a combination patent. The question of radiant heat was old in the art. The pivotal question would more logically appear to be, assuming that the radiant heat would work effectively, was it obvious that a more successful machine would evolve if all of the elements were constructed on one chassis? It is my opinion that such a combination was reasonably obvious to one possessing ordinary skill in the art.

Opinion of the District Court

Plaintiff relies on *Blaw-Knox v. I. D. Lain Company*, 230 F. 2d 373 (7th Cir. 1956) in which the patent was one for paving heavy concrete highways. There the patent solved problems which had been prevalent for years, and persons skilled in the art had attempted to utilize various combinations and suggestions to solve the problem. However, that is not the situation in the present case. In asphalt paving the only real problem has been the cold joint, and the prior art shows that radiant heat is the most successful answer to the problem.

In *A & P Tea Co. v. Supermarket Corporation*, 340 U. S. 147 (1950) the Court made the following statements:

"It is agreed that the key to patentability of a mechanical device that brings old factors into cooperation is presence or lack of invention.

. . .

"The negative rule accrued from many litigations was condensed about as precisely as the subject permits in *Lincoln Engineering Co. v. Stewart-Warner Corp.*, 303 U. S. 545, 549: 'The mere aggregation of a number of old parts or elements which, in the aggregation, perform or produce no new or different function or operation than that theretofore performed or produced by them, is not patentable invention.' "

. . .

"The conjunction or concert of known elements must contribute something; only when the whole in some way exceeds the sum of its parts is the accumulation of old devices patentable. Elements may, of course, especially in chemistry or electronics, take on some new quality or function from being

Opinion of the District Court

brought into concert, but this is not a usual result of uniting elements old in mechanics."

The Court then makes this meaningful observation:

"Courts should scrutinize combination patent claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements."

Plaintiff contends that its combination of elements has solved the age-old problems of asphalt paving; that the invention has, by its combination, produced a new result which has advanced the art, and further points to its commercial success and the fact that it has answered a long-felt want.

Entron of Maryland v. Jerrold, 295 F. 2d 670 (4th Cir. 1961), set forth the standard for determining whether the elements of a combination exhibit a new result in the following language:

"The inquiry should more appropriately be directed to whether the elements of the combination perform or produce a new, different or additional function or operation * * * in the combination than that theretofore performed or produced by them."

It is my opinion that plaintiff's combination in no way exceeds the sum of its parts. Each element of the combination performs in the same manner and performs that same job that it formerly did when not in combination. All that plaintiff has done is to construct four elements known in the prior art on one chassis. In regard to plaintiff's contention of commercial success, see *A & P Tea Co.*

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v. *Supermarket Corp.*, *supra*, at 153, wherein the Court stated:

“The Court of Appeals and the respondent both lean heavily on evidence that this device filled a long-felt want and has enjoyed commercial success. But commercial success without invention will not make patentability. . . .”

Based upon the foregoing, it is my opinion that the Neville patent is not a valid patent, and hence I find no need to rule on the question of infringement. Counsel may prepare an appropriate order incorporating this opinion by reference therein.

JOHN A. FIELD, JR.
United States District Judge

Dated March 23, 1967

**Final Decree of the District Court, S. D. W. Va.,
March 23, 1967**

**IN THE
UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA
Civil Action No. 2927**

PAVEMENT SALVAGE COMPANY, INC., Plaintiff,

v.

ANDERSON'S BLACK ROCK, INC., Defendant.

FINAL DECREE

This cause having been heard in open trial before me and having thereafter been briefed by counsel it is, upon consideration thereof, ORDERED, ADJUDGED AND DECREED as follows:

1. That my Opinion dated March 23, 1967, be in lieu of findings of fact and conclusions of law.

2. That United States Letters Patent No. 3,055,280 in suit is invalid.

3. That the complaint herein be, and the same hereby is, dismissed with costs to the Defendant.

Enter: This 29th day of May, 1967.

JOHN A. FIELD, JR.
Judge.

Approved by:

FRANK L. TAYLOR, JR.
EDWARD W. EARDLEY

Excerpts From Trial Transcript

(5)

FRANCIS C. WITKOSKI, called as witness on behalf of the plaintiff, being first duly sworn, was examined and testified as follows:

. . .

(6)

In 1955 I was appointed as director of research and testing for the Pennsylvania Department of Highways. The responsibilities in this appointment included responsibility for all of the materials used in the construction of highways in Pennsylvania as well as concern for the development of new materials, new products and new methods in the technology of building roadways or building highways.

During the time that I served as the director of research I was also a member of the American Association of State Highway Officials committee on materials and served as chairman of a subcommittee on paint materials and on several other committees, all involved with highway construction or highway building.

. . .

(18)

* * * A. A blacktop paver is a mobile piece of equipment. It can move along under its own power either on track or on rubber tires. The trucker backs into the hopper, lifts his bed and then the paver takes over. In other words, the paver is able to push the truck and accept material from the bed of the truck as it is being laid.

Q. Is the hopper the front end of the paver?

(19)

A. The hopper is the front end of the paver, yes. Then the material goes from the hopper by a conveyer or belt

Francis C. Witkoski—for Plaintiff—Direct

means through the machine and then it is placed or spread. You have a tamper and a cutoff screed. All of or at least most of the paving machines have self-leveling devices, self-leveling bars.

In other words, if they are resurfacing or if they are surfacing on a new roadway you may find slight indentations. This self-leveling bar then takes care of filling up these indentations or the inconsistencies on the surface. It certainly isn't as flat as this desk top.

* * *

(20)

* * * Now, these machines can lay generally a width of from eight to twelve feet of bituminous concrete pavement. When they do this, of course, they are not able then to lay the full width of a roadway because we are talking most generally now of pavements that are twenty-four feet wide and wider, so that the contractor has some alternatives there.

He can either use one paver and pave one lane for a day—let's say a day's run—and then end up with an exposed edge or a joint, or he can have two pavers running in tandem, one following the other, oh, about twenty-five or fifty feet somewhere, working distance. If he does this, then, of course, he is able to get full width covering.

If he doesn't run in tandem, and this is not always possible because when they are resurfacing you have to make provision for the maintenance of traffic and all contractors, of course, don't have a sufficient number of pavers anyhow, so that generally they will lay the one lane, one day's run. Then the next day they come back and start all over again and lay another lane to abut this edge, this two inch or two and a half inch edge that they have left.

Francis C. Witkoski—for Plaintiff—Direct

Depending upon the specifications of the state, here again that varies. Some states require that you cut back into the joint an inch or two inches and paint the exposed edge with

(21)

an asphaltic material, that is just plain asphalt, just the plain black asphalt, before you run your second course.

The Court: How would you cut back into the joint?

The Witness: There are a couple of ways to do it, either by hand or by using a pneumatic air hammer. It depends on how strict or how stringent the inspection is, and that it has to be cut and repainted, you see.

The Court: With a hot asphalt?

The Witness: With a hot asphalt, before the abutting course is laid. These are the alternatives that they have.

. . .

(22)

... A. Your Honor, this is the joint that we are talking about. We could be looking down the roadway in this direction. This is the full width of the roadway and we have placed one

(23)

lane. In practice then it isn't laid perfectly straight, you see, so that the requirement is generally that the material be cut back, this part then erased and the exposed material painted.

The reason that they require the painting is that as it is cut you disturb the structural strength that you have

Francis C. Witkoski—for Plaintiff—Direct

here. If it is put on at the same time, then it follows that these particles can fit together and coalesce into a single or individual piece and resemble the body of the pavement here, but as soon as we lay the material we begin to cool it and as we cool it we set it and these materials then take the place that they will eventually end up in.

To cut it, we disturb this structural strength and so the exposed stone is repainted and then another hot course is laid against it in hopes that what we do is end up with a complete ribbon of material without any sign of a joint or a juncture.

The problem with this is many fold and it is an old problem for reasons that can be readily seen. As you cut it, as I said, you disturb the structural strength first of all. Secondly, you build in a joint. By building in a joint, then you set your pavement, you immediately build in deterioration or the potential of deterioration because water, fine dirt and then the freezing and the thawing have their start in this

(24)

general area, and then we get disintegration.

Q. Excuse me just a moment, please. Mr. Witoski, you say "this general area". Do you mean now the place at which the two parallel courses abut? A. Yes.

Q. Thank you. A. At the joint. In other words, when we construct this way, when we build a joint this way, we are building a problem in by ourselves, you see, and setting up this pavement for eventual deterioration. I think that clarifies the reason why and how we cut it. Some states require that you cut back as much as four inches into the old wearing course. Should I continue with this?

Francis C. Witkoski—for Plaintiff—Direct

Q. I want to develop with you fully—I think this is the Court's question—there is a cold joint? A. This is what is referred to as a cold joint, yes.

Q. That is where one course is laid and comes down? A. And then eventually you put another course against it after it has cooled. As I said, as soon as you put your one lane down, your material begins to cool and set and if you allow this—if you pave for a day's run you end up with one lane and then this joint is cold.

The Court: Now, when you cut back and you get your

(25)

hot asphalt in there and then start laying your other course adjacent to it and abutting up against that joint, does this hot asphalt help cure these conditions or these possibilities of water or fine dirt seeping into the joint?

The Witness: Your Honor, I don't think that we can say that it cures them, but it is the thing that has been thought of as the best way of getting past the problem, and actually the painting is just to cover up the exposed pieces of aggregate.

For example, if you use pieces of limestone and you cut it, the edge where it is cut is white; it is just an exposed stone, so we repaint it and hope that with new hot asphalt it will get in there, and we try to close up this joint.

The Court: Was that the most common method of meeting this problem?

The Witness: That is even today a common method of meeting the problem.

The Court: All right. Go ahead, gentlemen.

Francis C. Witkoski—for Plaintiff—Direct

Q. Is the painting a successful cure for the problems of a cold joint? A. No, sir, it isn't.

The Court: In other words, when you say it isn't successful, I assume that you still have these problems of water.

(26)

The Witness: Yes, sir, you very definitely do. You very definitely do because you actually in cutting it, you get a nice pathway for the water, make it easy for the water to get into there.

. . .

(27)

Q. Mr. Witkoski, has the result of a cold joint been a problem in the construction and maintenance of bituminous highways? A. Yes, sir, it very definitely has been, and is.

Q. What are some of the undesirable results of the cold joint? A. The deterioration of the pavement. Pavements are designed to last for many years. Some of the pavements are designed to last for twenty years, forty years, or fifty years, and with an opening such as this, a cold joint, as I said, we build in deterioration so that actually after a winter in some cases or two you not only see this line of demarcation where your cold joint is, but you see that some of the material is beginning to come out, that you begin to lose material at the joint, and as that happens this degradation continues from the joint, from the cold joint inward into the center of the lane; the center of both lanes, as a matter of fact, and we have this

(28)

cupping action where we lose bituminous concrete and then we require repairs in this general area.

. . .

Francis C. Witkoski—for Plaintiff—Direct

(45)

Q. Mr. Witkoski, did you ever meet Charles A. Neville?
A. Yes, sir, I did.

Q. Will you tell the Court how you came to meet Mr. Neville and what transpired at that time? A. While I was director of research for the Pennsylvania Department of Highways one of my responsibilities was to meet with people who had new materials or new equipment that we could possibly incorporate into our specifications.

I don't remember exactly when I met or when Charles Neville came to my office. However, it was sometime between 1955 and 1960. It was sometime during my tenure that he came into my office, and during the course of the discussion he told me very generally that he had invented a piece of equipment that would heat the asphalt and that would not burn the asphalt. In other words, he had the secret to eliminating cold joints.

Charles Neville was a man that you wouldn't forget if you had seen him once. He was a very tall man, very large man, as a matter of fact, and outspoken to say the least. After some time in meeting with him I told him in not quite these terms that I didn't quite believe that he had such a piece of equipment. That was my first encounter or my first meeting with Mr. Neville.

Q. Did you hear of Mr. Neville later?

(46)

A. Yes, I did. In the fall—the first meeting I had with him I remember was in the summertime, and then the following fall I had a request from the Pittsburgh Engineering District to use an infrared heater on a bituminous concrete paver.

We had trouble with joints, with cold joints, in not only the metropolitan areas—that is Pittsburgh and Phila-

Francis C. Witkoski—for Plaintiff—Direct

delphia—but we also had it on all of our highways. We had a research team, a group of paving engineers from the Central Laboratory, as a matter of fact, in the Pittsburgh area at this time looking over some of the failures that we had in pavements, and by failures I mean areas where we had newly laid bituminous concrete that were showing signs of raveling or the loss of fine materials along the longitudinal joints.

This request that we had then we certainly were interested in because anything that would help eliminate this problem would have been to our advantage. So this group saw this piece of equipment, which was either hung or carried alongside of the bituminous paver, and they reported back to me that it looked good.

As a result of that we then asked Mr. Neville and Mr. Walker to supply us in the Highway Department laboratory with a few of these burners, just the burner unit itself, the

(47)

purpose there being for us to give it some laboratory testing to investigate it more fully.

We had a field report that it looked pretty good so we wanted to follow this up with some laboratory work, and they did deliver two or three of these burner units and the bituminous concrete laboratory kept them over the winter and we heated various types of mixes, we checked the distance from the surfaces of the mix, we checked the penetrations—as many things as we possibly could on a laboratory scale.

Q. Did you continue to have an interest following that?

A. Yes, because after that the joint heater or the first of the joint heaters, I guess the prototype or the model was

Alexander Quayle—for Defendant—Direct

finally made and we, of course, were interested in it because it did work.

. . .

(82)

ALEXANDER QUAYLE, called as a witness on behalf of the defendant, being first duly sworn, was examined and testified as follows:

Direct examination by Mr. Borst:

Q. Where do you live, Mr. Quayle? A. Ridgewood, New Jersey.

Q. And what is your present occupation? A. Vice-President of Aeroil Products Company, South Hackensack, New Jersey.

. . .

(102)

Q. I hand the witness a copy of the exhibit. Does the teaching in Morcom deal with the subject of repairing asphalt pavement? A. Yes. It covers a means of treating asphalt pavement by the application of radiant energy.

Q. In particular what problems in the repair of asphalt pavement does the Morcom patent expressly allude to and purport to solve? A. Well, he raises the problem of burning the surface of the asphalt by methods in use prior to his patent and he solves

(103)

that problem in the same manner as the Neville patent by the application of infrared or radiant energy. He also raises the problem of treating asphalt in place rather than removing it for treatment, and he solves this also in the same manner as the Neville patent by the application of radiant or infrared energy to the asphalt.

. . .

Alexander Quayle—for Defendant—Direct

(113)

Q. Now, supposing we are to hang an infrared burner on such a paver. Would there in your view be any change or modification of the mechanical functioning of the conveyor means? A. No, none at all. The heater would have no effect on the conveyor.

Q. Mechanically they are independent of each other? A. Yes.

(114)

Q. With regard to the leveler or screed, is its functioning at all dependent on whether heaters are present? A. No, it wouldn't be dependent on either the heaters or the conveyors. The screed and the tamper could be a separate item. As a matter of fact, one of the companies I represent, the Muller Machinery Company, makes a separate asphalt tamper and it performs the same function when it is separate as when it is a part of the asphalt paving machine that Barber-Greene makes.

Q. There is, then, no what we might call joint action between any of the three basic components of the paver and heater? A. No. The heater is hung on the paver merely because that's a convenient place to hang it when heating the longitudinal joint. As a matter of fact, both ourselves and Pavement Salvage make a separate heater which heats the transverse joint and is not hung on the paving machine.

It performs exactly the same function on the transverse joint as a separate heater, as this heater performs on the longitudinal joint and it heats it to attempt to give a better bond.

Q. Do I understand you to say, then that when the radiant heater is removed from the chassis for use on the transverse

Alexander Quayle—for Defendant—Cross

(115)

joint that the distributor and screed function just as effectively as they did when the heater was on the chassis?

A. Yes. When you take the heater off what you have left is a standard Barber-Greene paving machine.

Q. Is the mechanical operation of any one of the three main components in Neville changed or affected in any manner by the presence of the other components? A. No, I would say they are not.

(120)

. . .

Q. What is the name of this agency? A. The name at the time the tests were made was National Bituminous Concrete Association. They have changed their name since. They are called now the National Asphalt Paving Association. They are a national organization of paving companies.

(121)

. . .

Q. To what do you attribute this failure to make such recommendations? A. Well, the tests showed that the infrared heat did not improve the tensile strength of the joint and I think they agree with Mr. Witkoski, and I would agree also, that tensile strength is a very important property of the joint; and since the tests didn't increase the tensile strength, they felt that while there was a joint problem, it apparently wasn't solved by infrared, so they went on to make tests on other aspects of it and other areas where they felt they might improve the joint other than the use of infrared.

(124)

. . .

Cross examination by Mr. Blenko:

(127)

. . .

Q. And then after that you had turned your attention to the particular type of heater which we are interested in here, that is, joint heaters and the like. A. Yes.

Alexander Quayle—for Defendant—Cross

Q. Can you tell us when that took place? A. Not exactly. I would say in 1961 approximately.

Q. You have referred in your direct examination to a number of patents and publications. I would like to ask you if you have reviewed them all, that is to say, before you came here to give testimony to the Court. A. Yes, sir.

Q. And have you also reviewed the Neville patent in suit? A. Yes, sir.

(128)

Q. Have you reviewed the proceedings which led up to the granting of that patent, that is, the file wrapper? A. Yes, sir.

Q. Are we to understand that the import of your testimony on direct examination is that parts of what is set forth in the Neville patent may be found in these earlier references to which you have referred? A. I would say, rather, that all of what is disclosed in the Neville patent is found in earlier patents.

Q. All right. Which of the references that you have dealt with this morning most nearly approaches what is set forth in the Neville patent? A. I don't think I could be sure in answering that without going back over them again.

Q. Please do that. I don't mean to get an offhand impression. I ask that you refer to the patents. A. Could I borrow them all? I would say it is very difficult to pick one, but I think if I had to pick one I think I would pick the Morcom patent as being closest.

Q. And that is what you believe to be the best reference? A. Yes, although, as I say, I find it very difficult to pick one and say that's the best because the Wells patent, for instance—

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(129)

Q. Do you find any other patent that is better than the Morcom patent? A. Better in what way?

Alexander Quayle—for Defendant—Cross

Q. is a better reference against the Neville patent. A. Well, it depends on which elements you are discussing. I would say, for instance, the Schwank patent shows the burner part of the Neville device the best, but I am not a patent lawyer and I just have the feeling that you are asking me to do something that I don't have the ability to do, to pick out one of these patents which is the best reference.

Q. I don't want to ask you the questions as a lawyer at all, Mr. Quayle. The questions which I am asking you are for the purpose of laying the facts before the Court, and my understanding is that you had reviewed all these as a man claiming some skill in this art and that you were stating what you found set forth in these various references, and my question simply is which is your best reference.

I believe you have referred to the Morcom patent and
(130)

you have indicated, I believe, that that has some shortcomings and that you find other parts illustrated in the Schwank patent. Is that a fair statement of your position?

A. I would add to that that I find other elements illustrated in the Wells patent. I think you are talking about which of the three legs of a three-legged stool is the best, and I don't think I can answer.

Q. Let's deal with it in those terms then. Are we to understand that you look to these three patents to find what is set forth and disclosed in the Neville patent? A. No. If you put it in those terms, I would say that we look to all of those that have been entered.

. . .

Q. Is it a fair understanding of your answer that you must look to all of these patents to find what is disclosed and claimed in the Neville patent?

Alexander Quayle—for Defendant—Cross

(131)

A. Yes.

Q. And you do not find all those set forth in any single one of the prior art references. I think that necessarily follows but I want to have no doubt about it. A. Yes.

* * *

(151)

Q. Very well. When the paver moves down the roadway and places one lane of the pavement, that particular operation involves placing the blacktop material and then distributing it, striking it off of the screed and shaping the contour, does it not? A. Yes.

Q. The screed tamps it in and acts as a large flatiron to shape the material, giving it a smooth even finish? A. The tamper tamps it and the screed shapes it.

Q. It is a joint function of the two as the paver moves along? A. Yes.

Q. When the first course is laid upon the highway is a joint heater used at that point? A. Not normally. It could be.

Q. The actual use is ordinarily when laying a second

(152)

course parallel to the first, isn't it? A. Oh, I see what you mean by course. No, it wouldn't be used in laying the first lane. A course is normally the complete road. It isn't used in laying the first lane.

Q. All right. Let's deal with it in those terms? When the first lane is laid you don't use a joint heater? A. That's right.

Q. And you go back and lay a second lane alongside, parallel to the first lane, abutting to it? A. Yes.

Q. That is the time when the joint heater is used? A. It can be, yes.

James Lewis Burati—for Defendant—Direct

Q. At that time is not the function of the joint heater to make the first lane receptive to material in the second lane? A. Well, it is to make it hot. I am not sure I understand your meaning of the word receptive. It heats it.

Q. It is to produce a better bond at the joint, is it not? A. It is intended to. Whether it does or not I would say is questionable.

Q. Would you accept that at least it is intended to? A. Yes.

Q. There may be a dispute beyond that point? A. Yes.
(153)

Q. If the joint heater does in fact produce a better bond, that eliminates the cold joint, does it not? A. Yes.

Q. And that has a very real effect upon the bringing together of these two lanes, the marriage, if you will, of the blacktop material in the first lane with the blacktop material in the second lane? A. It has an effect. Again we get back to whether that effect is beneficial.

. . .

(170)

JAMES LEWIS BURATI called as a witness on behalf of the defendant being first duly sworn, was examined and testified as follows:

Direct examination by Mr. Borst:

. . .

Q. Where do you work? A. Anderson's Black Rock, Incorporated.

Q. How long have you been there? A. Fifteen years.

Q. Have you had experience there with asphalt paving? A. That's right.

Q. How long? A. Well, I have been with Andersons' for fifteen years and prior to that I was with the road commission during the summer months, in some cases as an asphalt inspector, blacktop inspector we call it.

. . .

(172)

Q. You are entirely familiar with the operation of the three units, the feeder, the heaters and the screed? A. Yes.

Q. Would it be a fact that the radiant energy heater when so suspended would operate effectively though the mechanical operation of the feeder were discontinued? A. Would the joint heater burn? Yes, it would burn.

Q. Just as efficiently? A. As efficiently? Yes.

Q. Would the feeder feed just as efficiently if the burners were not present? A. Yes.

Q. Suppose we should decide to do away with the mechanical feeder altogether and you had your men shovel aggregate onto the lanes to be paved. Would the screed level and plane or iron the so shoveled material as efficiently? A. Yes.

Q. Without the presence of a feeder?

(173)

A. Well, the feeder doesn't have anything to do with the screed unit. The feed unit brings the material back and the screed unit acts independent of the feeder.

Q. As far as you are concerned, mechanically the three units are independent? A. Yes.

Q. And function independently? A. Independently? Yes, they function independently as a unit.

Q. What is the principal advantage in using a joint sealer, radiant energy operated? A. Our main advantage to using joint heaters—actually we use the joint heaters because they are written into the specification. If we use a joint heater with the paving spread or paving machine, we can pave one lane, continuous lane, during the day and the next morning or that night back up and lay the second lane or pad the next day.

. . .

Francis C. Witkoski—Recalled—for Plaintiff—Direct
Francis C. Witkoski—Recalled—for Plaintiff—Cross

(187)

FRANCIS C. WITKOSKI, recalled as a witness on behalf of the plaintiff in rebuttal, having been previously duly sworn, was examined and testified further as follows:

(188)

Direct examination by Mr. Blenko:

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(193)

A. Infrared comes in varying amounts from any warm body.

• • •

(194)

Cross examination by Mr. Borst:

• • •

(198)

• • •

Q. Why is it, then, that today we don't use oil or gasoline to fuel the infrared heaters if one is about equivalent to the other, economically speaking? A. The propane is easier to handle. A propane tank is easier to handle.

Q. So might that not be the reason— A. So therefore it does contribute to the economy of the operation, yes.

Q. Might that not itself contribute to the commercial success today, such as there is, of the radiant energy heater? A. Yes, I would agree with that.

Q. Such wasn't available in 1905? A. Yes.

• • •

Excerpts From Deposition of Leslie B. Crowley

(3)

Examination by Counsel for Plaintiff*By Mr. Blenko:*

Q. Please state your name. A. Leslie B. Crowley.

Q. Where do you live, Mr. Crowley? A. 6720 Overbrook Street, Falls Church, Virginia.

Q. What is your occupation? A. I am a consulting engineer.

Q. I would like to have you state what your professional background career has been. I think it will be simplest if you will start with your educational background and continue on up to the present time. I would like you to do it in chronological order, stating what your employment has been and what has been the general nature of your duties. A. Yes.

I was graduated from high school in June of 1928. I attended American Technical School 1935-36; Lincoln Institute in 1937 and '38; Research Testing Training Institute of

(4)

the West Point Military Academy, 1939. I started work connected with civil engineering the summers 1926, '27, and '28 when I was a rodman and chainman for the Maine State Highway Commission; April 1929 to December 29, foreman, Northeast Construction Company, Northeast Harbor, Maine; 1930 and '31, rodman and chainman, Maine State Highway Commission; March '32-December '33, survey man, White Lovejoy Construction Company in Maine; January '34-August '35, foreman, Maine State Highway Commission; August '35-January '36, chief of party, Corps of Engineers, Department of the Army; January '36 to August '36, chief inspector, Closure Dams,

Excerpts From Deposition of Leslie B. Crowley

Passamaquoddi District, Corps of Engineers; August '36 to January '38, engineer, Boston District Corps of Engineers, Department of the Army, Office Engineering; January '38-December '38, construction superintendent, Highway Department, City of Boston, Massachusetts; December '38 to October '41, chief inspector, construction, Providence, Rhode Island, District Corps of Engineers; October '41 to July '42, civil engineering, McGraw-Purdy-Henerson, at Naval Operating Base, Bermuda; July 1942 to September 1942, assistant chief engineer, Mobile District, Corps of Engineers, Alatoona Dam Project; September '42 to June '43, deputy area engineer, Jacksonville, District Corps of Engineers, airfield construc-

(5)

tion; June 1943 to June 1944, Chief, Design and Test Section, Central Concrete Laboratory, North Atlantic Division, Corps of Engineers; June 1944 to June 1945, supervisory engineer, Engineer Division, Transportation Corps, Department of Army; June '35 to June '48, Chief, Roads, Railroads, Construction and Maintenance, Equipment Branch, First Army Headquarters, Department of the Army, Governors Island, New York. I was responsible for the functions of all those things. August '48 to June '51, Chief, Pavements and Railroads, and Assistant Chief of Civil Engineering, Installation Division, Strategic Air Command, United States Air Force; June of '51 to August of '56, Chief, Pavements and Railroads Section, Director of Installations, Headquarters, USAF; August '56 to July '57, Consultant, Civil Engineering, Director of Installations, Headquarters, USAF; July '57 to May 1960, Chief, Operational Facilities Branch, Director of Civil Engineering, Headquarters, USAF; and from May 1960 until the present time I am top consultant of

Excerpts From Deposition of Leslie B. Crowley

civil engineering, specializing in pavements and railroads, in the Directorate of Civil Engineering, Headquarters, USAF.

Q. Mr. Crowley, are you a registered professional engineer? A. I am.

(6)

Q. Where are you registered? A. District of Columbia, number 4261.

Q. Are you a member of any technical and professional societies relating to your profession? A. Yes, sir.

Q. Will you state those, please? A. Member, Consulting Engineering Association; member, National Society of Professional Engineers; member, American Society of Military Engineers; member, American Road Builders Association; appointed committeeman, Municipal Airport Division, American Society of Civil Engineers; elected member of Southern Highway Research Board Technical Committees; elected member, Aero Space Transport Division, American Society of Civil Engineers; chairman, Subcommittee for airfield pavement maintenance, American Society of Civil Engineers; charter member, American Institute of Plan Engineers; charter member, Association of Engineers, Architects and Scientists; appointed Air Force member, Highway Research Board, National Academy of Arts and Sciences; consultant to Air Force Institute of Technology; consultant to Air Force Academy.

Q. Mr. Crowley, has it been a part of your professional career to be involved with the construction and maintenance of bituminous pavements?

(7)

A. Yes. A great deal of my time is devoted to this very thing, construction and maintenance of bituminous pavements.

Excerpts From Deposition of Leslie B. Crowley

Q. Our interest today, Mr. Crowley, is in litigation involving the treatment of bituminous pavements with radiant energy. Can you tell us when that subject first came to your attention? A. Yes. Sometime prior to 1954 the man who I understood was the originator of "infra-red" heaters came to my office at that time. I was in the Pentagon. He explained to me what this infra-red heater would do to improve the maintenance and repair, shall we say, of pavements, particularly airfield pavements.

. . .

(8)

Mr. Neville attempted to interest me in this new device—at least it was new to me—and he did create some interest in me, but it was insufficient for me to take any action at that time; and, quite honestly, it was because I did not believe that this equipment would do the job. I don't like to say that, but that is what I believed at the time.

May I go on to say something about this?

Q. Please do. A. One of the principal uses of the infra-red heater as it benefits the Air Force and Government in general is that it heats the joints as you are laying down the flexible material and permits a "marriage" of the material or a binding of the material which precludes or greatly minimizes the separation which is caused by cold weather or dirty joints or for other reasons, deficiencies which have been a part of bituminous paving since the time asphalt or tar products were used.

Q. I am going to interrupt you for just a moment, Mr.

(9)

Crowley, because you have used some terms here which I know are quite well known to you but which may be quite strange to the court. A. Yes, sir.

Excerpts From Deposition of Leslie B. Crowley

Q. I would like to interject a few questions for that reason.

Will you tell us briefly the general process which is conventionally followed in laying a bituminous pavement. A. Bituminous pavements are placed in lanes, usually eight, sometimes 12 feet in width. The bituminous materials are placed at temperatures consistent with the requirements for handling. A run of several hundred feet is usually possible before the joint at the beginning of the run starts to cool. Under normal activities it is essential that the paving machine return to the beginning of the lane to start a new lane contiguous with the first lane.

Q. Are we to understand that you are referring now to laying a second lane parallel to the first? A. Contiguous width, touching.

Q. Side by side. A. In order to obtain a proper type joint, that is, one which will not separate upon curing or during cold weather, it is necessary that the temperatures of the joints, that of

(10)

the first lane and that of the second, be approximately the same temperature. The infra-red heater permits a reheating of the first lane joint when necessary and thus assures that the temperature of the original joint and the new joint is approximately the same when placed in the lane.

Q. When Mr. Neville came to you in 1954, or a little prior to that time, was separation at these joints recognized as a problem in the paving industry? A. Yes. Cold joints or separation at the joints has been the most difficult problem to overcome in the bituminous paving busi-

Excerpts From Deposition of Leslie B. Crowley

ness since asphalt tars were used. Many efforts have been made to solve this problem over the years but none were successful. It appears that the infra-red heater does this job satisfactorily.

(11)

A. Prior to President Kennedy's January 1961 inauguration, a requirement arose for repair of the aircraft parking area at Andrews Air Force Base. It was cold weather that December. The temperatures during the time of the repairs dropped down to 20 degrees Fahrenheit, or slightly colder. In order to minimize cold joints it was decided to use the infra-red heater. Considerable interest was evidenced in the use of this equipment and some other Government agencies sent representatives to observe. One of these representatives was the head of the paving school at the Engineer Research and Development Laboratories at Fort Belvoir, Virginia. As a result of his interest in the equipment and the apparent good job that was being done, he caused a number of samples to be taken from the joint and these samples were tested at the Corps of Engineers Research Development Laboratories. Reports of these tests indicate that during oscillograph readings they were unable to find the joint in the pavement.

• • •

**Claims 16 and 18 as Originally Filed in Neville
Application**

16. The method of placing parallel courses of bituminous paving free of longitudinal faults and fissures which comprises laying a course of paving material, progressively subjecting a longitudinal edge of the material to penetrative radiant energy, progressively placing a parallel course of paving material abutting said edge following application of said energy thereto, and then compacting the placed paving material forming a pavement characterized by freedom from longitudinal joint fissures.

18. Apparatus for treating a bituminous pavement for extension of its service life comprising generating means to generate penetrative radiant energy, and means to maintain said generating means in fixed relative position to the pavement for advance along the pavement.



Supreme Court of the United States

No. 1014 ----- , October Term, 19 68

Anderson's-Black Rock, Inc.,

Petitioner,

v.

Pavement Salvage Co., Inc.

ORDER ALLOWING CERTIORARI. Filed March 24 ----- , 19 69.

The petition herein for a writ of certiorari to the United States Court of

Appeals for the **Fourth -----** Circuit is granted, and the

case is placed on the summary calendar.

And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.



REPORT VOLUME

Supreme Court of the United States

October Term, 1927/9 67

No. 1012 45

ANDERSON'S BLACK BOOK, INC.,

Petitioner,

v.

PAVEMENT SALVAGE CO., INC.,

Respondents.

Writ of Certiorari to the United States Court of Appeals
for the Fourth Circuit

Submitted for Consideration and Filing 4, 1929

Certiorari Granted March 24, 1930



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Municipal and Pavers Catalog (PX-13)	
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No. 799,014.

PATENTED SEPT. 5, 1905.

J. H. MORCOM.

APPARATUS FOR REPAIRING ASPHALT PAVEMENTS.

APPLICATION FILED DEC. 9, 1904.

SHEETS-SHEET 1.

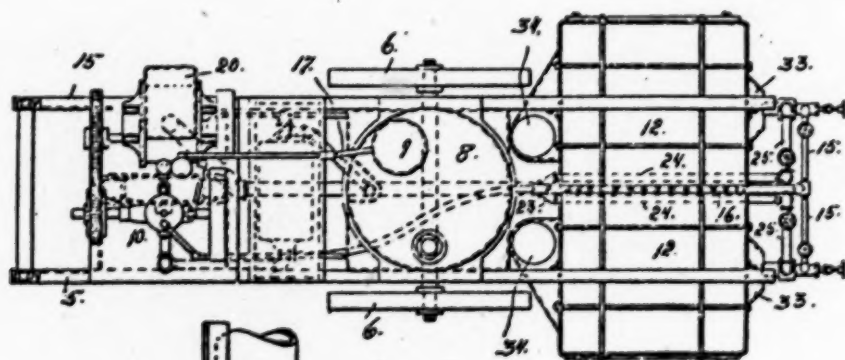


Fig. 1.

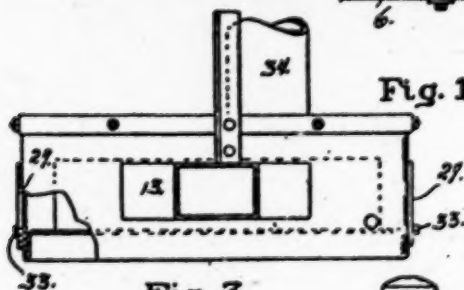


Fig. 3.

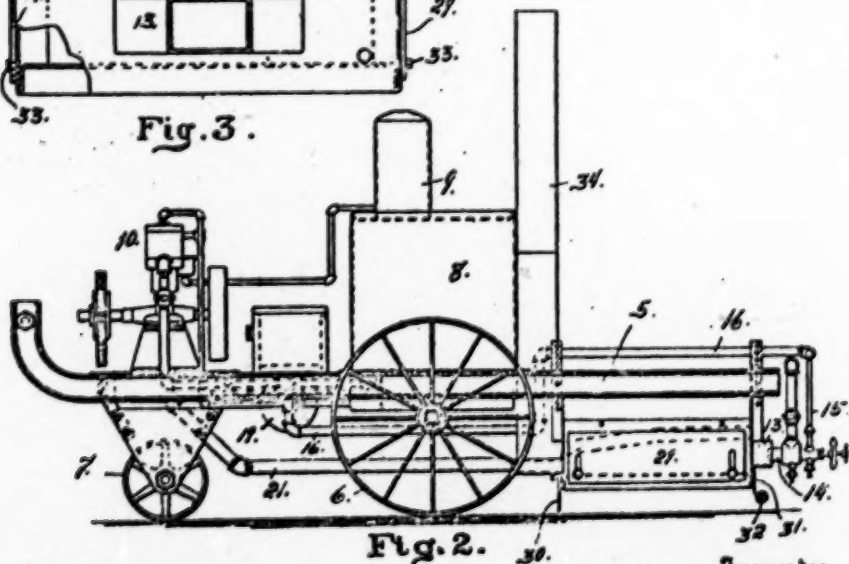


Fig. 2.

Witnesses
Otto E. Hindrich.
Denn Nelson.

J. H. MORCOM

J. H. Morcom
 by

Attorney

No. 799,014.

PATENTED SEPT. 5, 1905.

J. H. MORCOM.
 APPARATUS FOR REPAIRING ASPHALT PAVEMENTS.

APPLICATION FILED DEC. 8, 1904.

SHEETS-SHEET 2.

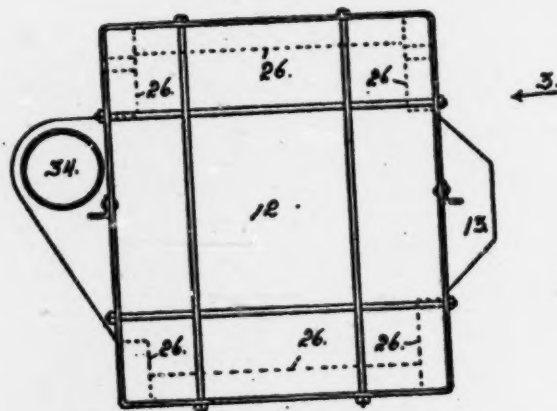


Fig. 4.

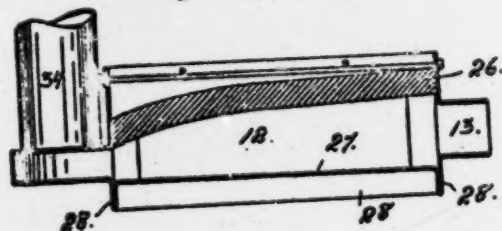


Fig. 5.

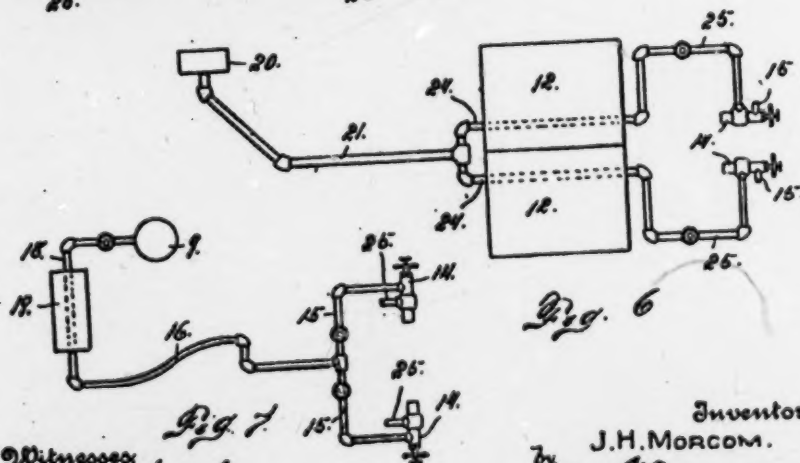


Fig. 6.

Witnesses
 Otto E. Haddick
 Lena Nelson,

Inventor
 J. H. MORCOM.
 Attorney

UNITED STATES PATENT OFFICE.

JOHN H. MORCOM, OF DENVER, COLORADO, ASSIGNOR TO THE ECONOMIC ASPHALT STREET REPAIRS COMPANY.

APPARATUS FOR REPAIRING ASPHALT PAVEMENTS.

No. 799,014.

Specification of Letters Patent.

Patented Sept. 5, 1905.

Application filed December 5, 1904. Serial No. 235,518.

To all whom it may concern:

Be it known that I, JOHN H. MORCOM, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Apparatus for Repairing Asphalt Pavements; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to means or apparatus for repairing asphalt pavements. It is well known that pavement of this character needs repair in spots at intervals, and my improved apparatus is designed to facilitate and cheapen this work by treating the old pavement in place in such a manner as to cause it to unite with the new compound necessary to even or level the worn-off surface, thereby saving a great waste of material as compared with the method now in vogue in which the old pavement is chopped out and thrown away and replaced entirely with new material. Heretofore, so far as I am aware, the machines employed for this purpose are adapted to apply either a direct flame or a blast of hot air directly to the pavement. Either of these methods (especially the flame) has a tendency to burn the surface of the asphalt, thus preventing it from uniting with the new material.

In my improved construction the heat is conveyed by radiation from the bottom of the combustion-chamber, which is maintained in suitable proximity to the pavement, whereby the heat is effectually applied. I also employ means surrounding the combustion-chamber and adapted to drop down upon the surrounding pavement to prevent the cooling action of the outer air, which otherwise would result. By means of this protection the heat of the combustion-chamber is more economically utilized.

Having briefly outlined my improved construction, as well as the function it is intended to perform, I will proceed to describe the same in detail, reference being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a top or plan

view of my improved apparatus provided with two combustion-chambers. Fig. 2 is a side elevation of the same. Fig. 3 is a rear view of Fig. 4 or a view looking in the direction of the arrow 3 in Fig. 4. Fig. 4 is a top or plan view of one of the combustion-chambers shown on a larger scale than in Figs. 1 and 2. Fig. 5 is a central section taken through one of the combustion-chambers. Fig. 6 is a diagrammatic view illustrating the air-supply used in connection with the oil-burners. Fig. 7 is a similar view illustrating the apparatus for supplying the fuel-oil to the burners.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a suitable framework mounted on large wheels 6 and a centrally-located small wheel 7. In the drawings I have simply illustrated a suitable vehicle adapted to support my improved apparatus, together with such other appliances of ordinary construction as are found convenient for use in connection therewith. These consist of a fuel-oil tank 8 for supplying the oil-burners and a gasoline-tank 9 for supplying the gas-engine 10.

Supported upon the rear extremity of the vehicle are two combustion-chambers 12, each of which is provided with a rear opening 13, into which projects an oil-burner 14, suitably mounted and supplied with oil from a branch pipe 15. The two branch pipes lead from a main oil-supply pipe 16, which communicates with the fuel-oil tank 8. The portion of the pipe immediately connected with the bottom of the oil-tank I will designate 17. This pipe leads to a branch 18, which passes through the muffler 19 of the gas-engine in order to heat the oil preparatory to its delivery to the burners in order to facilitate its vaporization. After passing through the muffler 19 the oil flows to the main oil-pipe 16, which extends rearwardly a suitable distance, thence upwardly, and thence rearwardly again above the combustion-chambers, as best illustrated in Fig. 2. The necessary air is supplied to the burners from a blower 20, whence it passes through a pipe 21 to a point 23 just in front of the combustion-chambers, where it divides into two branches 24, which pass through the respective combustion-chambers in which the air is heated in order to facilitate the atomizing and ignition of the oil. These pipes 24

lead to valve-controlled branch pipes 25, which enter the burners 14 between the oil-delivery pipes 15 and the forward extremities of the burners.

- 5 Each combustion-chamber is lined at the top and sides with fire-brick or other suitable material 26. The top lining is clearly shown in Fig. 5, while the lining at the sides and ends is illustrated by dotted lines in Fig. 4.
- 10 The bottom of each combustion-chamber is closed by a comparatively thin plate 27. This bottom of each chamber is surrounded by a depending flange 28. Each combustion-chamber is further supplied with vertically-adjust-
- 15 able side slides 29, adapted to be dropped down upon the pavement surrounding the place of repair in order to further confine the heat, which it is of course desirable to limit in its action to the exact spot on the pavement
- 20 where repair is necessary. The front of each combustion-chamber is provided with a depending hinged plate 30, while the rear extremity of each chamber is provided with a plate 31, having a roller 32 at its lower extremity. Each slide 29 is provided with slots,
- 25 through which pass set-bolts 33. It is evident that by loosening these bolts the slides may be raised and lowered at will. The front of each combustion-chamber is connected with
- 30 a vertical stack or smoke-pipe 34.

From the foregoing description the use and operation of my improved apparatus will be readily understood. The apparatus when in use is moved to such a position that the combustion-chambers are directly above the place

35 in the pavement to be repaired. The side slides 29 are then dropped downwardly, the oil and air turned on to supply the burners, and the combustible mixture lighted. Flames

40 from the burners are thus delivered to the respective combustion-chambers, whereby the bottom of each chamber is highly heated and delivers its heat by radiation to the portion of the pavement to be repaired. This heat pre-

45 pares the said portion of the pavement to receive the new material and unite therewith, as heretofore explained.

Attention is called to the fact that the openings 13 of the combustion-chambers are considerably larger than the extremities of the burners which project therein in order to

50 allow sufficient free air to enter the combustion-chambers by virtue of the suction induced by the issue of the air and oil from the burners

55 for combustion purposes.

Having thus described my invention, what I claim is—

1. In an apparatus for repairing asphalt pavement, the combination of a combustion-chamber closed at the bottom, and means
- 60 mounted on the apparatus for heating the combustion-chamber, whereby its bottom delivers heat by radiation at the place of repair, substantially as described.

- 65 2. In an apparatus of the class described,

the combination with a suitable vehicle, of a combustion-chamber mounted thereon and having a closed bottom, means for heating the combustion-chamber, and means mounted thereon for confining the heat to the desired

70 location, substantially as described.

3. The combination with a suitable vehicle, of a combustion-chamber mounted thereon, said chamber being closed except at its extremities which are open for the introduction
- 75 of combustible mixture and free air for its combustion and for the escape of the products of combustion respectively, the closed bottom of the combustion-chamber being supported in suitable proximity to the surface
- 80 where the apparatus is to be used whereby the heat may be delivered to the said surface by radiation, and suitable means mounted on the vehicle for confining the heat within the desired space or locality for the purpose set
- 85 forth.

4. The combination with a suitable vehicle, of a combustion-chamber mounted thereon and having a closed bottom, the said chamber also having an opening for the introduction
- 90 of a combustible mixture and free air for its combustion and also an opening for the escape of the products of combustion, a burner mounted in suitable proximity to the fuel-opening of the combustion-chamber, and
- 95 means for delivering oil and air to the said burner for the purpose set forth.

5. The combination with a suitable vehicle, of a combustion-chamber having a closed bottom adapted when the chamber is heated to
- 100 throw heat downwardly by radiation, a burner mounted to deliver a combustible mixture to the combustion-chamber, a conduit for delivering fuel-oil to the burner, means for heating the oil on its way to the burner, and an
- 105 air-conduit passing through the combustion-chamber and connected with the said burner whereby the air is heated before it is delivered to the burner for the purpose set forth.

6. The combination with a suitable vehicle provided with a fuel-oil tank, a blower and means for operating the same, of a combustion-chamber also mounted on the vehicle and having a closed bottom, a burner mounted to deliver a combustible mixture to the combustion-chamber for fuel purposes, a conduit
- 115 leading from the fuel-oil-supply tank and passing through the combustion-chamber, said conduit being connected with the burner outside of the combustion-chamber, a conduit
- 120 leading from the blower to the burner, and means surrounding the air-conduit during a portion of its course, for heating the air on its way to the burner.

7. The combination with a suitable vehicle, of a combustion-chamber mounted thereon and having a closed bottom, the walls of the combustion-chamber except the bottom being protected by a lining of suitable material, a burner for delivering a combustible
- 130

ture to the combustion-chamber, means for supplying air and fuel-oil to the burner, and means for heating the air and oil before they are delivered to the burner, substantially as described.

1. The combination with a suitable vehicle, a plurality of distinct combustion-chambers mounted thereon and having closed bottoms, a burner mounted to deliver a combustible mixture to each combustion-chamber, an air-conduit having branches passing through the respective combustion-chambers, the said air-conduits being connected with the re-

spective burners, and an oil-conduit for supplying the burners with oil, said conduit having branches leading to the respective burners, and suitable means for heating the oil on its way to the burners, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN H. MORCOM.

Witnesses:

NORMAN V. FITTS,
DEXA NELSON.

PATENT SPECIFICATION

E 6

756,911



Date of Application and filing Complete

Specification: Dec. 3, 1954.

No. 35141/54.

Application made in Netherlands on Dec. 7, 1953.

Complete Specification Published: Sept. 12, 1956.

Index at acceptance:—Class 107, F(4:5:6).

COMPLETE SPECIFICATION

Improvements in or relating to Methods and Machines for Laying and Smoothing Bituminous or Asphaltic Paving and for Similar Purposes

I, GERARDUS SMIT, of No. 47 Linneauskade, Amsterdam, Netherlands, a Subject of the Queen of The Netherlands, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

My present invention relates to a method and a machine for surfacing a road with an asphaltic or a bituminous mix, or for similar purposes, said material being laid on new subgrade or existing pavement, compacted and smoothed in successively laid longitudinal strips extending side by side.

In cases wherein it is not possible—with the use of a travelling road paving machine provided for instance with means for evenly spreading asphaltic material stored in softened condition in a hopper and discharged onto the road through an aperture extending crosswise of the direction of travel of the machine, compacting it by a movable tamper and smoothing it by a screed or the like—to lay the paving in one run covering the full width of the road, it is necessary for the material to be laid in two or more strips disposed side by side. If, as will ordinarily be the case, only one machine is available, it is then necessary to lay said strips successively. Under these conditions, the strips laid in one run will necessarily have to be of reduced length, because the first strip should still be relatively soft when the second strip is being laid alongside thereof. If the time interval between the laying of the first and that of the second strip exceeds a certain limit, it is difficult to produce a perfect bond of the strips. Indeed, the asphaltic material is compacted by the machine to a certain degree and immediately thereafter still further compressed by a roller.

Compacting and compressing said material is, as a matter of course, possible only as long as the material is still relatively soft.

Therefore, if the first strip has cooled down to below a given temperature and the marginal zone thereof has, as a consequence, a rather high degree of hardness, it is impossible to secure a reliable bond between the strips, for the fresh asphaltic material laid on the marginal zone of the first strip during the laying of the second strip cannot be pressed into the material of the first strip and this gives rise to the formation of a ridge, which impairs the smoothness of the road surface.

If, during the laying of the second strip, the end portions of the tamper of the machine, which tamper acts as a vibrator, engage the relatively hard marginal zone of the first strip, downward movement of the tamper is impeded thereby, so that the freshly laid asphaltic material of the second strip is imperfectly compacted. Moreover, the subgrade, which is present intermediate said hard ridges and the tamper, is crushed since it cannot be forced into the ridge, and is likely to damage the end portion of the tamper. In addition, the tamper may crush the hard ridge, which further interferes with the reliability of the bond.

The consequence of the above phenomena is that it is necessary, after the laying of the two strips, to still finish the seam, which involves a considerable deal of labour and cost.

A defective bond between the strips has the disadvantage that in cold weather and owing to contraction of the paving, the width of the joint is increased. Also in that case the seam has to be finished.

Transverse ridges in the paving are a nuisance to the traffic and give rise to progressively increasing irregularities of the road surface owing to the fact that vehicles travelling thereon begin to oscillate. Now, in view of the statements in the foregoing paragraphs, the lengths of the strips to be laid in one run of the machine may not ex-

ceed say 25 metres, even under favourable weather conditions, i.e., when the temperature of the atmosphere is high, and this entails an excessive number of transverse joints 5 in the paving of the road. Besides, since the excess of asphaltic material laid at the end of each strip is to be returned to the hopper, this increase of the number of transverse joints, entails correspondingly increased 10 delays and unfavourably affects the homogeneity of the hot material in the hopper owing to said excess material having a much lower temperature and a greater hardness than that in the hopper.

15 The above difficulties can be avoided if, in accordance with the invention, after the laying of a strip, a side marginal zone thereof is heated and thereby softened, just before the next strip is laid alongside said first 20 strip. If this side marginal zone is sufficiently soft, the asphaltic material of the second strip can readily be pressed into that of said zone, even so that the seam disappears altogether. The bond thus produced between 25 the strips is very strong, so that contraction of the material will not result in fissures in the seam. The tamper of the machine is then capable of pressing the subgrade into the paving everywhere, also into the softened 30 side marginal zone of the first strip, so that the subgrade cannot be crushed between the tamper and said zone. Consequently, the tamper is not liable to damage.

Other advantages derived from the invention 35 are that weather hazards are greatly eliminated and that strips of any desired length can be laid before a second strip is laid alongside thereof, so that much time and labour are saved and traffic delays and tie- 40 ups are minimized. If necessary, the various strips may even be laid at considerable time intervals. It will be understood that the number of transverse joints is reduced as the length of the strips laid in one run is 45 increased.

A machine adapted to carry out my novel method may be provided at one or at either side with a heating device in front of, but close to the opening through which the 50 asphaltic material is discharged onto the road, said device being adapted to heat a side marginal zone, of predetermined length and width, of the previously laid, adjacent strip of the surfacing material. Said device 55 may comprise a metal shoe having a smooth bottom face and being adapted to be heated. Preferably, the heating device should be vertically adjustable relative to the road surface, so that it can permanently be held at a level 60 a small distance above the surface of the paving, the latter thus being heated mainly by radiation.

The said shoe may be formed as a hollow, elongated metal block accommodating a 65 burner whose flame is adapted to develop

lengthwise within the block, and the latter may be provided with a front opening shaped as to cause the hot combustion gases escaping therethrough to impinge on the road surface to heat and thereby soften the already 70 hardened asphaltic material in front of the block.

The accompanying drawing shows, by way of example, a machine in accordance with the invention. 75

Fig. 1 is a side elevational view of a machine of known usual construction for laying asphalt in strips on a road, said machine being provided with a heating device in accordance with the invention; and 80

Fig. 2 is a cross sectional view along the line II-II in Fig. 1, drawn to an enlarged scale, of said device.

Referring to the drawing, 1 is an asphalt paving machine of known construction, 85 wherein softened asphaltic material 2 stored in a hopper 3 is discharged, as at 4 and by means not shown, onto the surface of a road, compacted by a tamper 5 adapted to be vertically reciprocated at high speed, and there- 90 after levelled or screeded to a desired profile as at 6. This machine is driven by means of endless tracks 8 to travel in the direction indicated by the arrow 7, but since it is well known, it is not necessary to describe it in 95 further detail.

On at least one of its sides the machine is provided with a heating device 9 in accordance with the invention. This device comprises an elongated hollow iron block having 100 a plane, smooth bottom face and being suspended from the frame of the machine by means of threaded rods 10 and nuts 11 so as to be adjustable in vertical direction.

Secured to the block 9 at the rear end 105 thereof is a burner 12 connected, by means of a hose 13, to a reservoir 14 containing propane or butane. The burner can thus produce a flame extending lengthwise through the chamber of the block, and the 110 hot gases of combustion can escape through a discharge opening 15 at the front of the block. Said opening is shaped as to direct the combustion gases downward in an inclined manner to the road to heat the paving 115 immediately in front thereof.

The heating device, which is mounted a short distance ahead of the discharge opening 4 of the machine, serves to heat the marginal zone of a previously laid and set paving strip 16 through a suitable length and width to render said zone sufficiently soft as to be adapted, under the influence of tamping and rolling, to firmly unite with the heated asphaltic material 17 for the newly 125 laid adjacent strip and form a seamless surface coating therewith.

The height of the block 9 above the road should be adjusted so that the bottom face of the sole of the shoe is at a level a slight 130

distance 18 above the previously laid strip 16.

What I claim is:—

1. A method of surfacing a road, by a machine, with a layer of asphaltic or similar material, which is discharged, compacted and levelled in the form of longitudinal strips extending side by side and laid successively, characterized in this, that, after one strip has been laid, its marginal zone that is to be united with another strip, is softened, by heating, just prior to said other strip being laid by the machine on the adjacent portion of the road.

2. A travelling machine for carrying out the method claimed in Claim 1, comprising means for evenly spreading over the road softened asphaltic material stored in a hopper, through a discharge opening extending crosswise of the direction of travel of the machine, a movable tamper for compacting said material, and means for levelling said material, characterized by a heating device provided on at least one side of the machine in front of and close to said material discharge opening, said heating device being adapted to heat a marginal zone of an

adjacent previously laid strip of said material.

3. A machine as claimed in Claim 2, characterized in that the heating device comprises a shoe member having a smooth bottom face and means for heating said shoe.

4. A machine as claimed in Claim 2 or 3, characterized by means for vertically adjusting the position of the heating device relative to the road surface.

5. A machine as claimed in Claim 2, 3 or 4, characterized in that the heating device comprises an elongated hollow metal block in combination with a burner adapted to produce a flame extending lengthwise through the chamber of the hollow block.

6. A machine as claimed in Claim 5, characterized in that the block is provided with a front opening shaped as to direct the combustion gases escaping therethrough towards the road surface in front of the block so as to locally heat said surface.

REDDIE & GROSE,
Agents for the Applicant,
6, Bream's Buildings, London, E.C.4.

756,911

COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of
the Original on a reduced scale.

FIG. 1

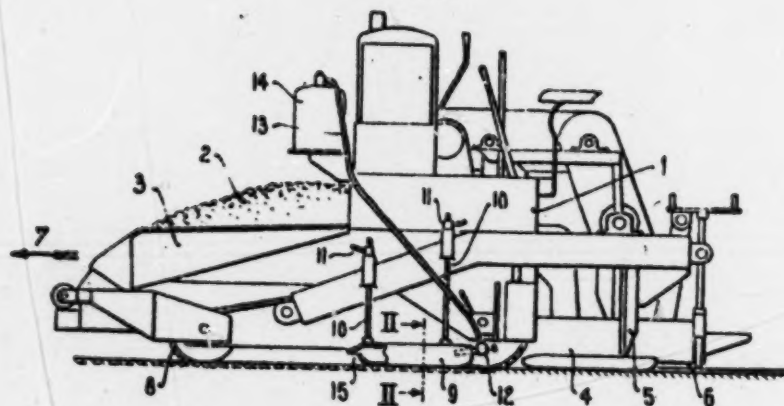
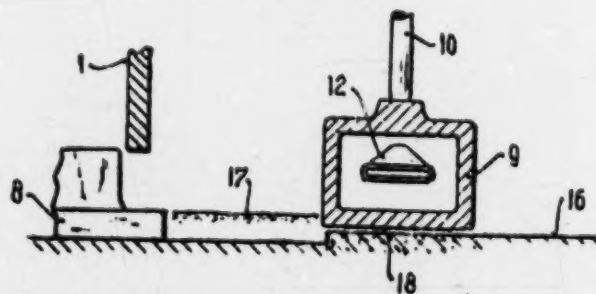


FIG. 2



preface

**COPYRIGHT 1943, 1951, 1955,
and 1963.**

By

**BARBER-GREENE COMPANY
AURORA, ILLINOIS, U. S. A.**

FIRST EDITION

First Printing 3-43-15M
Second Printing 9-43-8M
Third Printing 11-44-4M
Fourth Printing 11-46-4M

SECOND EDITION

First Printing 3-51-15M
Second Printing 1-52-20M

THIRD EDITION

First Printing 5-55-20M
Second Printing 7-58-10M

FOURTH EDITION

First Printing 4-63-25M

*Permission to reproduce
portions of this hand-
book may be obtained
from Barber-Greene Com-
pany, Aurora, Illinois*

For many years Barber-Greene has published data for its own servicemen to use in the erection and operation of Barber-Greene Bituminous Plants and Finishers. As this material was seen by others in the bituminous construction industry, its value was recognized and many requests were received for such data. The Barber-Greene Bituminous Construction Handbook was the result.

The use of this Handbook has now become so general that we have completely revised it with this edition, greatly amplifying the engineering data included, and as far as possible, restricting all of the information included to accepted practices.

Our business is the design and manufacture of bituminous construction equipment, and we do not pretend to be final authorities on bituminous construction itself. However, our organization has been fortunate in having been in close contact with construction operations throughout this country, and in many other parts of the world. We have observed, studied and discussed materials and methods with experienced engineers over a wide area. These contacts have contributed immeasurably. We are indebted, directly and indirectly, to many agencies and individuals for much of the materials included here.

We have striven to present the material in a simple, practical manner designed specifically for contractors and construction engineers doing bituminous paving. We present it with the hope that it will be of help and frequent usefulness to everyone connected with the paving industry.

BARBER-GREENE COMPANY

continuous layers are often placed on old pavement surface to increase the life of the pavement or to produce a new surface. This is usually a simple operation and is done in the above application.

In the resurfacing operation the finisher is operating on the base provided by the old pavement surface. Therefore, the screed becomes the important feature of the tractor

LAYING AT VARIABLE WIDTHS. The first step before any laying operation is to decide what width mat is required and to prepare the machine with proper extensions, screeds, shoes, etc. to lay this required width. A standard machine with the use of cut-off shoes can be set up to lay mat widths varying over a wide range of dimensions. Screeds can be used singly or in pairs and with the use of cut-off shoes, the laying width of the machine can be increased or decreased beyond this range.

In multiple lane work, the cutoff shoe should always be opposite the joint matching side and the final lane should be at least the width of the machine. Using these rules and knowing the total width of the pavement, proper width and sequence of lanes can be established. Screeds and extensions to the finishing machine, it is important that the extensions perform the same function as the main part of the screed. If it is a tamping screed, the extension section should also incorporate a tamper bar. If it is a vibratory screed, it is equally important that the extensions contain the vibration feature. Otherwise the mat laid by the extension section will be different than the main mat.

MATCHING PAVEMENTS. When matching a joint to a previously laid, a small overlap is helpful in preventing decrease in thickness. If the machine is started out with an overlap of 2", a qualified operator should be able to guide the machine with not less than 1" nor more than 2" overlap, provided care was exercised in laying a straight lane.

When matching a joint that has been previously laid and the depth of the overlapping mat must be high enough so that additional compaction from the roller will bring the new mat down only to the level of the old mat. Excessive overlap prevents sufficient density of material in the new mat ahead of rolling, and will also likely cause cracking and tearing under the screed.

Barber-Greene Company

A recent development in joint matching has been a propane fueled infra-red heater attached on the side of the finisher next to the previously laid mat. The purpose of this unit is to preheat the existing mat edge just ahead of the screed, to achieve a hot joint between the two mats.

FINISHERS WORKING IN ECHELON. This type of operation is frequently used in airport and highway construction. The first finisher usually operates from 50' to 100' ahead of the second finisher, which is matching the joint of the first machine. In addition to the high capacity advantage obtained, the joint quality is also improved because both strips are hot when the joint is made, assuring union of material and a smoother joint with less rolling.

In tandem operations the roller must keep away from the inside edge on the first strip about 6" to 12". Then the second strip can be laid the same depth as the unrolled part of the first strip and the roller can then compact the joint while the material is hot.

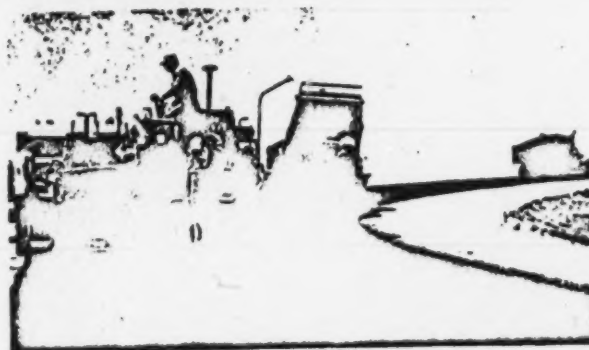


Figure 7-13 — Finishers Working in Echelon

CITY STREET CONSTRUCTION. Paving and repaving operations in city street construction impose some added considerations. It is often desirable to flatten the crown of the pavement at the intersections. This is accomplished by adjusting the synchronized crown control, which reduces the crown in both the leading and trailing edges of the screed by an equal amount.

Manholes require some hand work in asphalt paving operations. On the binder, or first course, the screed is lifted over the obstruction, or a ramp used to make the screed

Aurora, Illinois, U. S. A.

continuous layers are often placed on old pavement surface to increase the life of the pavement or to produce a new surface. This is usually a simple operation and is done in the above application.

In the resurfacing operation the finisher is operating on the base provided by the old pavement surface. Therefore, the screed becomes the important feature of the tractor

WORKING AT VARIABLE WIDTHS. The first step before any laying operation is to decide what width mat is required and to prepare the machine with proper extensions, cut-off shoes, etc. to lay this required width. A standard machine with the use of cut-off shoes can be set up to lay mat widths varying over a wide range of dimensions. By using extensions singly or in pairs and with the use of cut-off shoes, the laying width of the machine can be increased or decreased beyond this range.

In multiple lane work, the cutoff shoe should always be placed opposite the joint matching side and the final lane should be at least the width of the machine. Using these rules and knowing the total width of the pavement, the proper width and sequence of lanes can be established. By using extensions to the finishing machine, it is important that the extensions perform the same function as the main part of the screed. If it is a tamping screed, the extension section should also incorporate a tamper bar. If it is a vibratory screed, it is equally important that the extensions maintain the vibration feature. Otherwise the mat laid in the extension section will be different than the main

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In matching a joint that has been previously laid and the depth of the overlapping mat must be high enough so that additional compaction from the roller will push the new mat down only to the level of the old mat. A large overlap prevents sufficient density of material in the new mat ahead of rolling, and will also likely cause cracking and tearing under the screed.

Barber-Greene Company

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FINISHERS WORKING IN ECHELON. This type of operation is frequently used in airport and highway construction. The first finisher usually operates from 80' to 100' ahead of the second finisher, which is matching the joint of the first machine. In addition to the high capacity advantage obtained, the joint quality is also improved because both strips are hot when the joint is made, assuring union of material and a smoother joint with less rolling.

In tandem operations the roller must keep away from the inside edge on the first strip about 6" to 12". Then the second strip can be laid the same depth as the unrolled part of the first strip and the roller can then compact the joint while the material is hot.



Figure 7-13 — Finishers Working in Echelon

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Manholes require some hand work in asphalt paving operations. On the binder, or first course, the screed is lifted over the obstruction, or a ramp used to make the screed

Aurora, Illinois, U. S. A.



pavers' digest

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NO. 1

AEROIL PRODUCTS CO., INC. SOUTH HACKENSACK, N.J.

MARCH, 1963

"THIS AND THAT"

Paving Contractors on the West Coast will be glad to know that Dick Hiers is settled in Napa, California. Dick has 21 years of Aeroil experience and is now in charge of Aeroil sales on the West Coast.

All-Wheel Drive Co. of Davenport, Iowa recently demonstrated an Aeroil HE-PR-18 when temperature was minus 10°F. Sold it too! Contractor is using it to shave high spots on utility

"Big John" Hamilton almost caught Dakotas during recent cold spell blizzard.

SVENSKA TRAKTOR is now distributing Aeroil Infra-Red in SWEDEN. City of Clifton, N.J. recently took delivery of 230 gallon bottom-fired heater. New York City recently ordered six more of the ever-popular Combination Tool Heater & Kettle.

Aeroil Infra-Red Dealer Sales Conference starts February 1st, 1963.

The latest list of users of Aeroil Infra-Red Asphalt Heaters includes:

Federal Aviation Agency, Washington, D.C.

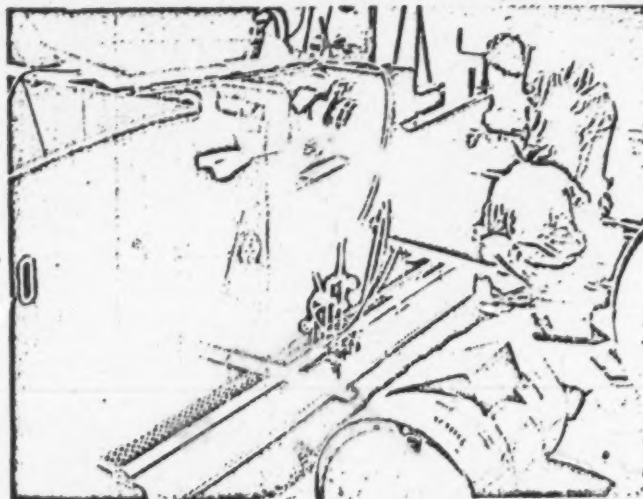
McGuire Air Force Base, New Jersey

Shaw Air Force Base, South Carolina

Lincoln Air Force Base, Nebraska

Reese Air Force Base, Texas

MORE & MORE HIGHWAY ENGINEERS SPECIFY INFRA - RED JOINT SEALING

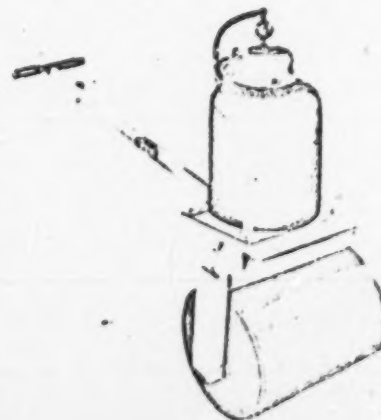


Infra-Red joint sealing is fast being written into asphalt highway specs by engineers that are aware of joint problems and why they occur. A truly homogeneous joint is obtained by using

the Aeroil HE-PR-8DL. Pilot Lights are standard equipment. Recent orders from Sweden, Israel and Australia indicate the worldwide interest in this new approach to an old problem.

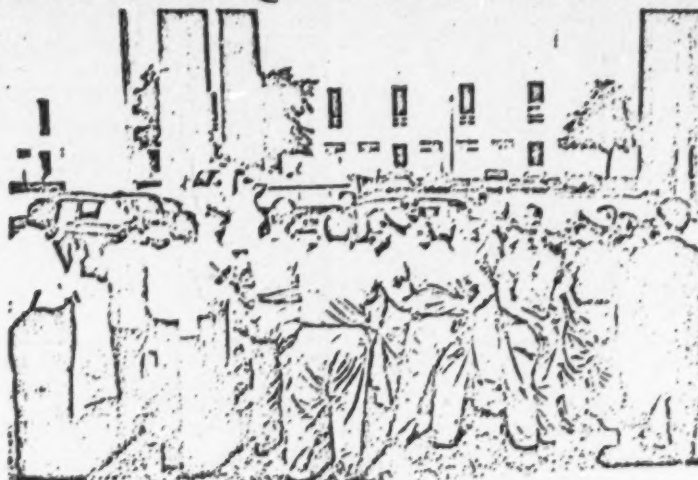
HEATED ROLLER

The Aeroil Heated Roller, featuring two LPG burners, is extremely versatile because of its ability to "get in close" to the curb. The two large burners make this unit ideal for sealing patches, edge work around manholes and curbs, and general driveway and parking lot work. It has also proven to be an excellent companion piece for the Aeroil line of Infra-Red Asphalt Highway Patchers. ONLY \$198.00 F.O.B. Factory.



ASPHALT EQUIPMENT SEMINAR

E13



MUNICIPAL
AND
PAVERS
CATALOG

NEW PAVERS CATALOG AVAILABLE

An all new Pavers 20 page catalog available FREE. Write to Aerofil Products Co., Dept. PD, South Hackensack, N.J. requesting Pavers Catalog No. 80.



ALL NEW LUTES AVAILABLE SAVE \$3.00

The all new 36" Aluminum Lute is now available at a special price if the order is accompanied by this column and a check for the full amount. The lute has a 7' full aluminum handle with (2) two heavy duty cross braces on the lute. Serrated on one side and flat on the other side. This lute has been favored by Pavers for years at \$6.50 each. You can save \$1.50 each by ordering two lutes for \$30.00. Send your check AND this column to Miss Conette Arnold, c/o Aerofil Products Co., South Hackensack, N.J.

This is THE Lightweight — Heavy Strength Lute that is in use from Coast

Carl Carlsson of Aerofil recently held an equipment Seminar for all of the asphalt crews in the New York City Park Department. Care & Maintenance of Asphalt Kettles and Tool Heaters was thoroughly covered by Carlsson. This is the second year that the Seminar was held in New York and is paying big dividends by re-

ducing asphalt equipment maintenance costs as well as eliminating costly "Down-Time" of the asphalt equipment. Municipalities or contractors wishing such a free maintenance clinic should write to Aerofil giving a tentative date that would be suitable to bring as many asphalt men and equipment together.

OPEN INVITATION

We cordially welcome all of our friends in the paving industry, including municipal highway officials to visit our plant whenever you are in the vicinity of New York City. If you are planning a trip into this area, we will be glad to help with hotel reservations. Drop a note to either Emil Truemper or Joe Halperin and let us know when you will be arriving — we'll be looking for you.

PAVERS — HEAR THIS!

In a recent contest to find the oldest Aerofil Heat-Master Kettle still in use — a roofing contractor in Bradford, Pennsylvania won a new kettle when he submitted proof of using the same Aerofil Kettle for 26 years. Purchased in 1936 — it still operates every day.

Just one more indication of Aerofil "RUGGED CONSTRUCTION" — with the contractors needs in mind.

AUTOMATIC CONTROLS — KEROSENE BURNERS

Automatic Temperature Controls are now available on Aerofil Kettles equipped with kerosene burners. After four years of field testing, these controls will eliminate the necessity of removing torch from kettle when material reaches proper temperature. They are only available factory installed on new kettles.

Write for free literature describing Road Oil Burners that fit any make Distributor.

A new 4 page brochure is available describing Aerofil Infra-Red equipment and applications.

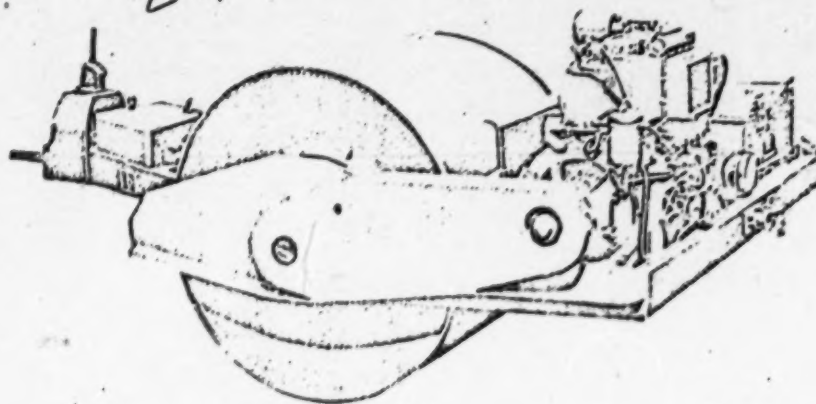


The Aeroll Cut-Back Sprayer features a safety valve that turns off the pump when the operator is spraying the tank under pressure. Available in two sizes—110 gallon and 200



Edward of Service Supply Corp. is enjoying himself at the Hospitality Suite at a recent convention. The Service Supply Corp. markets Aeroll in Eastern Pennsylvania and carries a complete stock of equipment, tools and parts. In the background is Leo Mulligan, the Factory Representative in Pennsylvania, Maryland and Virginia.

of Greeley, Colorado is the satisfied user of an Infra-Red roller repairing their streets.



R.A. Hamilton of Hackensack, N.J. operates two Aeroll Vibratory Tandem Rollers every day on the Tough Jobs. These units outperform everything in their weight class. Small additional

initial investment returned one hundred fold in greater work capability and minimum maintenance. Write for free Bulletin VR-1 Today!



Harry Pulver the Aeroll Development Engineer who had the most to do with developing Aeroll's Infra-Red equipment, is shown proudly demonstrating the 120,000 BTU Joint Sealer to a group of asphalt crew foremen.



Paving Contractors in Arkansas will recognize this fine Southern gentleman as Mr. Mac Lyons. Mac has operated the Lyons Machinery Co. in Little Rock for more years than he cares to remember. They carry a complete stock of Aeroll Paving Tools and Equipment and ship promptly anywhere in Arkansas or Northern Louisiana.

NEW PRODUCT NEWS

WATCH FOR THE ONLY HEATED "WALK-BEHIND" VIBRATORY ROLLER. THIS UNIT WILL BE INTRODUCED IN THE SPRING OF 1963 AND YOU CAN OBTAIN LITERATURE WHEN IT BECOMES AVAILABLE BY WRITING NOW TO EMIL TRUEMPER OF AEROIL PRODUCTS CO., 69 WESLEY ST., SOUTH HACKENSACK, N. J.

ASPHALT INSTITUTE LETTER

E15

This excerpt from a recent letter shows how the Asphalt Institute Engineers feel about Aeroil Infra-Red Joint Sealers.

"We are especially pleased to have the information on your Infra-Red Joint Heater since we are actively encouraging contractors to purchase units of this type for use on asphalt paving machines in order to insure better joint construction."

PAVERS LAMENT

He stood before the pearly gates,
His face was scarred and old.

He stood before the man of fate,
For admission to the fold.

"What have you done?" St. Peter said,
"To gain admission here?"

"I've been a paving contractor, sir,
For many and many a year."

The pearly gates swung open wide,
St. Peter touched the bell.

"Come in and choose your harp, my
friend,
You've had your share of hell."

Savino is certainly busy demonstrating the Model HE-PR-48 Infra-Red High-Maintenance unit.



Model HE-PR-32 and a Model HE-PR-8DW are shown above being demonstrated to the Parkway Commission. Both of the units stayed with the maintenance crews all year and did an excellent job.



PRODUCTS CO., INC.

1000 N. St. So. Hackensack, N. J.

CHICAGO LOS ANGELES

Myers & Quigg Asphalt Co
910 St SE
Washington, D C

PC-33

CONTE EQUIPMENT CORPORATION
WILLIAM PENN HIGHWAY (ROUTE 22)
P. O. BOX 8607
PITTSBURGH 21, PA.

E-16

13

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MUNICIPAL
AND
PAVERS
CATALOG

PAVERS
TOOLS
AND
ACCESSORIES

HIGHWAY
PAVERS

Received December 17, 1962

117

W. L. THOMA, Sales Representative ^{E-12}

Into Equipment Corp. Salesman
at our office at 900 Union
Pgh. 12, Pa.

ASPHALT MAINT. CO.

Robert H. State ^{ES}

ADDITIONAL
AEROIL
EQUIPMENT
PORTABLE
HEATERS
POWER
BUGGIES
CLEANING
TANKS
CONVEYORS
HOISTS
ASPHALT
TANKERS

AEROIL PRODUCTS COMPANY, INC.

69 Wesley Street

South Hackensack, New Jersey

Branch Offices
and Warehouses:



3217 Union Pacific Ave.
Los Angeles, Calif.

4648 South Western Ave.
Chicago, Ill.

RUBBERIZED
ASPHALT
KETTLES



E-18

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deroil
SPECIAL

E-19

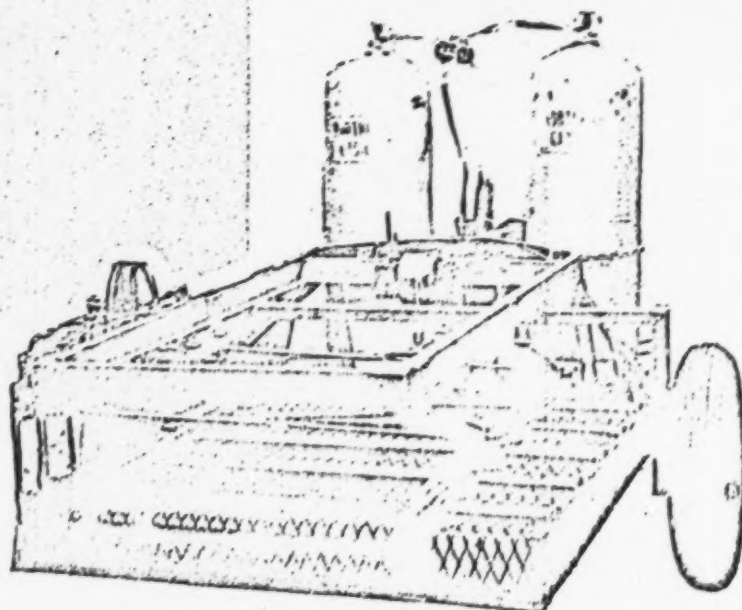
INFRA-RED PATCHER — TRAILER MOUNTED

A. — HE-PR-48

Is designed for the PERMANENT repair of Bituminous bumps, cracks and pot-holes. Properly used, the unit will not burn existing material, but will heat large areas, which can be raked and rolled without adding new material.

Pot hole repairs are made permanent through the creation of a homogeneous joint between the old material and the new. Only through an Infra-Red process such as this is a permanent result possible.

The HE-PR-48 is mounted on a 2-wheel trailer chassis with a hand winch for raising and lowering the Infra-Red generators. The generators themselves achieve penetration in an approximate area 16 square feet within 3 minutes. With this increased coverage and faster penetration time, a smaller crew is needed than previously used for this type of work. The new unit can be trailed behind an ordinary pick-up truck. Perfect for road repair work where time is of an essence in keeping traffic flowing smoothly.



- DOES NOT BURN ASPHALT
- REPAIRS ASPHALT PERMANENTLY
- IDEAL FOR HOLES, CRACKS, BUMPS

SPECIFICATIONS

Length—Heater Unit	52"
Width—Heater Unit	48"
Overall Dimensions:	
Length	10 ft. 6 in.
Width	70 in.
Height	61 in. with bottles
Height Heater Frame	33 in.
BTU Rating	600,000
Pneumatic Tires	5.90 x 15 4 ply
Weight	Approx. 725 lbs. with bottles empty



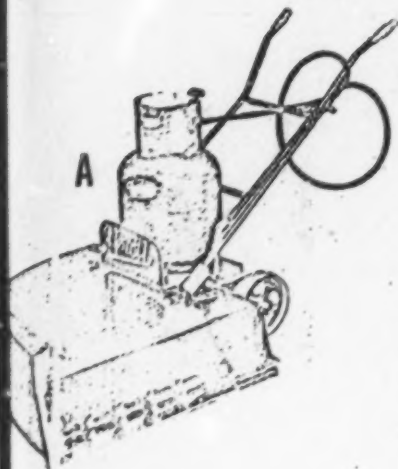
E. 20

INFRA-RED HIGHWAY PATCHERS AND JOINT SEALERS

A. — THE PERMANENT METHOD OF ASPHALT PATCHING

The Patcher is equipped with three cylindrical stainless steel infra-red generators which give uniform infra-red frequency radiation. The generators are placed at the foci of stainless parabolic reflectors to provide maximum reflection and uniform infra-red radiation to the pavement.

The units operate on propane with generator orifice pressure of at least 10 PSI to assure windproof performance. Bottle rack with chain is provided for a 20 lb. propane cylinder. Removable handles, metal wheels, and necessary hose, pressure regulator and POL fittings are furnished as standard equipment.



#595.4

HE-PR-32

- DOES NOT BURN ASPHALT
- REPAIRS ASPHALT PERMANENTLY
- IDEAL FOR HOLES, CRACKS, BUMPS

Length—Heater Box	31"
Width—Heater Box	34"
Weight	110 lbs.
Overall Dimensions	40 x 70 x 34
Wheels	8" Steel

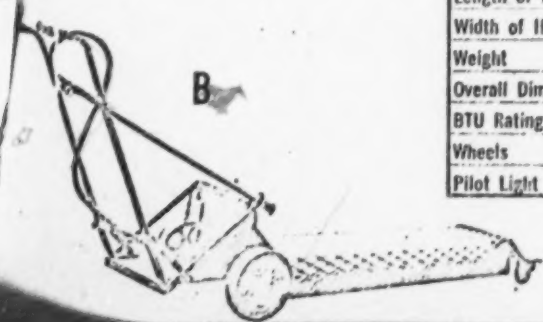
B. — HE-PR-8

The Joint Sealer is suspended from the side of a paving machine, heating the edge of the previously laid asphalt to secure a perfect bond. Usually two HE-PR-8D units are used end to end as shown in the photo. The transverse joints are heated by a small wheel mounted unit, the HE-PR-8W or HE-PR-8DW, similar to that used on the paving machine and specifically designed for efficient heating of a narrow strip of pavement.



- SEALS PAVING JOINT PERMANENTLY
- DOES NOT BURN ASPHALT
- ATTACHES EASILY TO PAVER

	HE-PR-8W	HE-PR-8DW	HE-PR-8D
Length of Heater Box	54"	54"	54"
Width of Heater Box	10"	10"	10"
Weight	70 lbs.	100 lbs.	80 lbs.
Overall Dimensions	8 x 10 x 54	8 x 10 x 54	8 x 10 x 54
BTU Rating	60,000	120,000	120,000
Wheels	Std.	Std.	none
Pilot Light	Std.	Std.	Std.



Aeroil
SPECIALTY

PAVERS TOOLS AND ACCESSORIES

E-21

SMOOTHERS					
Model	Stock No.	Weight	Dimensions	Overall Length	Handle
0 Smoother	76902	47 lbs.	6½" x 10"	6' 7"	1¼" Steel Pipe
1 Smoother	76901	57 lbs.	7" x 11"	6' 7"	1¼" Steel Pipe

TAMPERS					
Model	Stock No.	Weight	Base Dimensions	Overall Length	Handle
1 Tamper	76161	17 lbs.	6" x 6"	4' 2"	1¼" Steel Pipe
2 Tamper	76162	31 lbs.	6" x 8"	4' 8"	1¼" Steel Pipe
3 Tamper	76163	36 lbs.	6" x 8"	4' 8"	1¼" Steel Pipe
Heavy Duty					

A.— ASPHALT RAKE

Forged from bar steel. Head 16¾" wide, 14 teeth 4" long. Shank 18". Safe to heat and clean. Handle 5'. Weight 8½ lbs.

B.— HOE-SCARIFIER

Blade 10" wide with serrated head on one side and scoring point on other. ¾" pipe handle 6' long. Weight 13½ lbs.

C.— HAND TYPE SQUEEGEE

Bituminous grout and seal coat spreading. Double rubber composition blade 20" long x ½" thick x 5" wide, removable. ¾" extra heavy pipe handle 6' long. Weight 18 lbs. BLADES Extra composition rubber blade. Weight 1½ lbs.

D.— LUTE

Lightweight 36" aluminum lute. One edge serrated, the other straight. Handle 8' long. Optional 6' extension handle.

E.— ASPHALT SANDALS

Strap over paver's shoes, wood soles with inside drop heel. Heavy galvanized counter. Smooth bottoms. Adjustable padded straps over toe and instep. Medium, Stock No. 76150; Large, Stock No. 76151. Weight: pair 4 lbs.

F.— SMOOTHIE TOOL HEATER

Heats two tampers or smoothers. Propane fired. Mounted on wheels or legs for truck mounting. Does not include gas hose or bottle. Height with handle 38". Width, not including wheels 18". Inside width of tool chamber 15". length 14½". Weight 135 lbs.

G.— HEATED ASPHALT ROLLER

A "finishing roller" as well as a "one man paver" for walks, driveways, and patios. Illustration shows compact unit with handle telescoped to 5 feet. For quick transportation, a hook is provided for the roller to hang from a truck tailboard. Asphalt does not adhere to roller, no scrapers or water sprays needed. Two LPG burners. Hose and regulator furnished. Does not include gas bottle.

SPECIFICATIONS			
Steel Roller Width	18"	Heat Up Time	10 Min
Diameter ¾" Steel	12"	Maximum LPG	
Dimensions		Consumption Per Hr.	2.5 lbs.
Length (Handle telescoped)	60"	Weights	
Length (Handle extended)	96"	Without Bottle	148 lbs.
Width	22"	Rolling With Bottle	185 lbs.
Height	36"	Shipping (No Bottle)	160 lbs.



INFRA-RED

*turns
this*

Permanent asphalt repair now costs less than

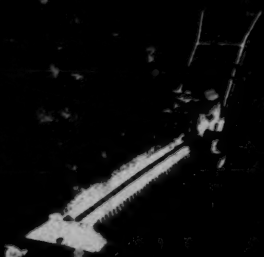


to
this..... **PERMANENTLY**

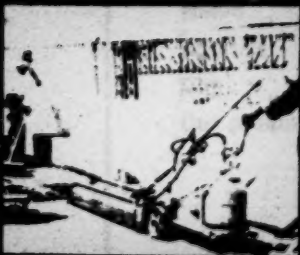
temporary repair:



HE PR 81
Franklin County, Mass.
Gardner State Parkway



HE PR 81W
Nassau County
Long Point Expressway



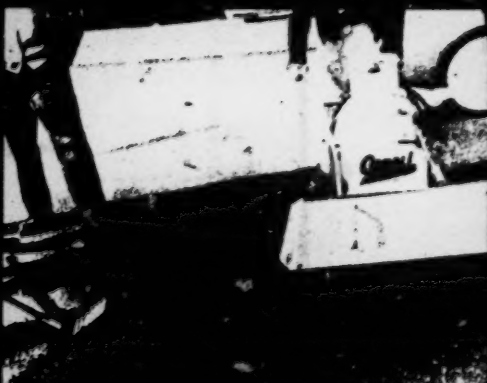
HE PR 81W TWIN
Nassau County
Goodwin Bridge



Highway Resurfacer



HE PR 90



HE PR 17
Somerset, Mass. at Mt. Wachusett

A few users of AEROIL INFRA-RED equipment:

City of Saginaw, Michigan
Sicilian Asphalt, Brooklyn, N. Y.
Winfore Co., Minden, La.
Gulf Asphalt Corp., Panama City, Florida
Wright-Patterson Air Force Base, Dayton, Ohio
Sheboygan County, Sheboygan, Wisconsin
Streets and Roads Inc., Milwaukee, Wisconsin
Vally Construction Co., Rock Island, Ill.
City of Davenport, Davenport, Iowa
Ho-Tu-Mix Co., Iluer Grove, Minn.
City of Ashland, Kentucky

City of Huntington, West Virginia
F. F. Earp and Son, Inc., Fairmont, W. Va.
State Construction, Inc., Huntington, W. Va.
City of New York
New York Port of Authority
City of Omaha, Nebraska
State of Arkansas
TRUAX AFB., Wisconsin
Commonwealth of Mass.
Scott AFB., Ill.

If you are a highway or road official, or a contractor engaged in the application or repair of asphalt surfaces then you should at least investigate the tremendous potential of this equipment. Fill out the coupon below and let us provide you with a **FREE** demonstration of this equipment on your highway.

YES, AEROIL, We would like a **FREE Demonstration:**

Name

Address

City State

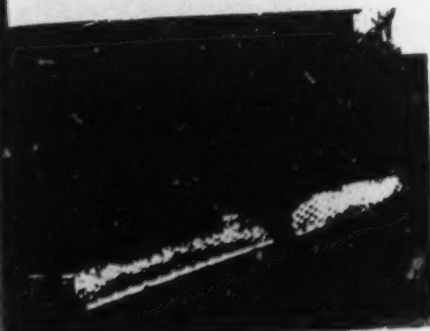
Our pavement repair problem is:

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HE-PR-8L and HE-PR-8D JOINT SEALERS

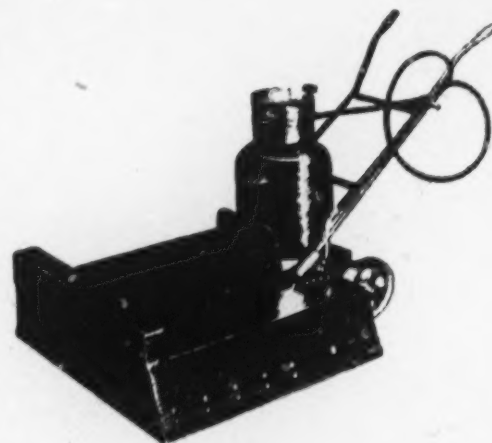
Specifically designed for JOINT SEALING, this INFRA-RED gives permanent joints on new highways when laying new pavement. It reheats the cold joint without burning and bonds the two surfaces PERMANENTLY. NO retouching or repairing the following years. PERMANENT job is accomplished. The HE-PR-8L is used in tandem suspended from a paving machine. HE-PR-8L utilizes two HE-PR-8D units, the HE-PR-8D is 30,000 BTU and the HE-PR-8L is 240,000 BTU. The machine should be used in cooler weather or the paving machine moves faster than 30 FPM. Units can be attached to any standard paving machine. They are furnished complete with all necessary parts, hangers, pilot light, and pressure regulators.

HE-PR-8L

— Heater Box	96"
— Heater Box	10"
	180 lbs.
Dimensions	8x10x105
Rating	240,000
Light	Std.

HE-PR-8D

— Heater Box	48"
— Heater Box	10"
	80 lbs.
Dimensions	8x10x54
Rating	120,000
Light	Std.



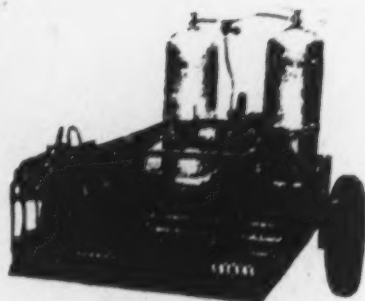
HE-PR-32 HAND PORTABLE PATCHER

Will repair and resurface bumps, ridges, cracks around manholes, traffic heaves, high spots and similar jobs PERMANENTLY. Has penetrating power with 4 INFRA-RED generators. Will not burn or injure asphalt because of the INFRA-RED process. Easy for one man to operate and move about. Perfect for small asphalt crew.

The HE-PR-32 unit consists of four 30,000 BTU INFRA-RED generators mounted beneath stainless steel parabolic reflectors. It is furnished complete with wheels, handles, pressure regulators, lighting torch and bottle rack with safety chain. The unit is operated at gas pressure of 20 psi, and consumes LPG fuel, which is controlled through a high pressure regulator.

HE-PR-32

Length Heater Box	31"
Width Heater Box	34"
Weight	110 lbs.
Overall Dimensions	40x70x34
Wheels	8" Steel
BTU Rating	120,000

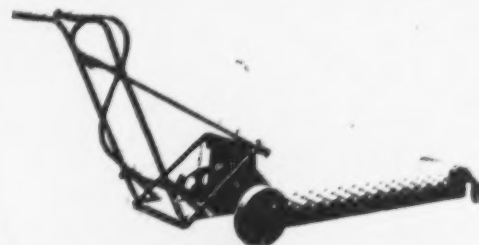


HE-PR-52 PATCHER

Patcher gives PERMANENT repair on larger holes, sunken sections of roads and resurfacing of driveways and runways. For patching asphalt over old and laid gas and sewer lines, and for heating concrete before applying epoxy coating. Eliminates cutting on chuck holes, with air compressors and chipmills, also hauling of new asphalt and tools, therefore permits the asphalt crew to repair more holes per day. HE-PR-52 is self contained and has racks for carrying own fuel bottles. The heating grid is adjustable for flexibility to the operator for varying weather conditions and surface conditions. Easily towed by any vehicle. The unit has 10 INFRA-RED generators with pilot lights.

HE-PR-52

Heater Unit	52"
Heater Unit	48"
Dimensions:	
Length	10 ft. 6 in.
Width	70 in.
Height	with bottles 61 in.
Heater Frame	33 in.
Weight	600,000
Electric Tires	5:90x15 4 ply.
approx. 725 lbs. with bottles empty.	

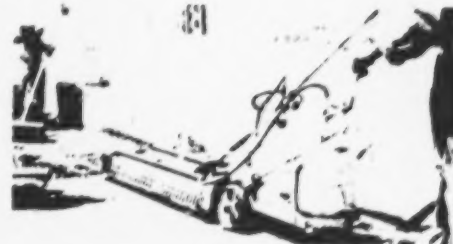


HE-PR-8DW JOINT AND CRACK SEALER

Here is the unit for sealing cracks and joints PERMANENTLY. The HE-PR-8DW is a single unit on wheels to permit you to operate on small areas as driveways, parking lots, transverse joints on highways and roads. The HE-PR-8DW is also AVAILABLE as a TWIN PATCHER as shown in photo and Specs. below.

HE-PR-8DW

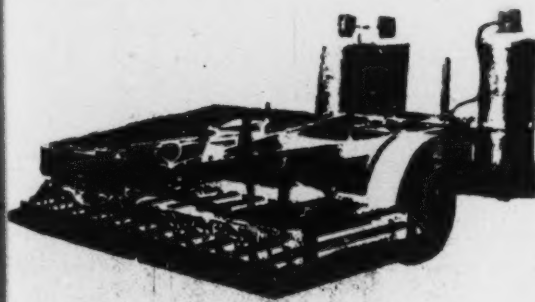
Length — Heater Box	48"
Width — Heater Box	10"
Weight	100 lbs.
Overall Dimensions	8x10x54
BTU Rating	120,000
Wheels	Std.
Pilot Light	Std.



HE-PR-8DW TWIN

Length — Heater Box	48"
Width — Heater Box	20"
Weight	190 lbs.
Overall Dimensions	8x10x54
BTU Rating	240,000
Wheels	Std.
Pilot Light	Std.

All our INFRA-RED products specifically utilize the Radiant Heat method to assure you of the most economical, efficient, and dependable performance in repairing road PERMANENTLY.



HE-PR-96 HIGHWAY RESURFACER

The HE-PR-96 resurfaces asphalt highways and eliminates the necessity to plane the surface and eliminates repaving —HEAT-RAKE-ROLL. The same asphalt can be rerolled because the INFRA-RED process will not injure the existing asphalt. The HE-PR-96 has 20 INFRA-RED generators, which cover an overall width of 96". The unit is easily towed behind a pickup truck. It contains LPG bottle racks for 4, 100 lbs. cylinders of gas, and standard equipment includes pressure regulators and all necessary hose, lighting torch and pilot light.

HE-PR-96

Overall Length	139"
Overall Width	96"
Overall Height with bottles	61"
Water Frame Height	33"
CU Rating	1,200,000
Weight, approx.	1,700 lbs.
Weight adjustment	Hand Winch
Bottle Rack (4) 100 lbs. bottle cap.	

INFRA-RED

PERMANENT ASPHALT REPAIR

This remarkable new development is a dramatic breakthrough in asphalt highway and road maintenance. INFRA-RED heat is not new, but the application is revolutionary. The INFRA-RED process softens the asphalt without burning the surface. It eliminates the necessity of repair of the same chuck holes, cracks, and joints every year. Resurface only once with INFRA-RED and the repair is PERMANENT.



before



after

Shown here is the visual proof of the INFRA-RED process. These photos demonstrate the perfect result achieved with INFRA-RED. This repair was made with existing asphalt, no new asphalt was needed. The bond of the surface is PERMANENT and no injury was made to the asphalt. The joint between old and new surface becomes bonded PERMANENTLY. There will be no pick-up of asphalt to repair the following years, once an INFRA-RED unit is used on the job it becomes PERMANENT.

Complete Specifications on all INFRA-RED units are on the following pages. There is a unit to fit every purpose, from chuck holes to complete highway resurfacing.